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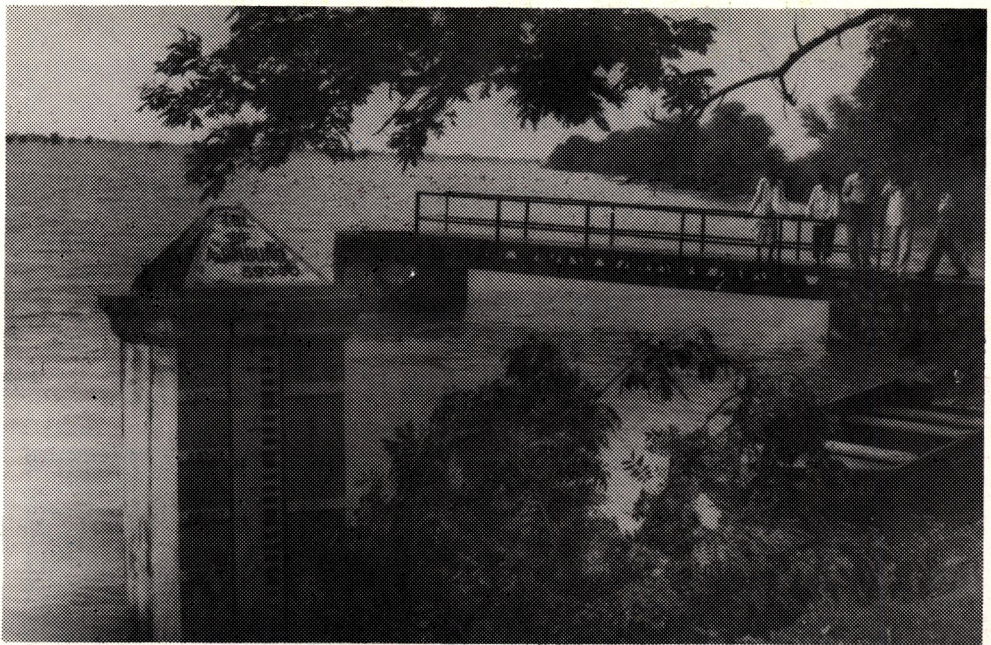
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SIBERIAN CRANES

Photo : kailash Navrang



A VIEW OF AZAN DAM

Photograph Courtesy : kailash Navrang

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Honorary Secretary.

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EDITORIAL

Anglo-Saxon Chronicle once published the following couplets on William the Conqueror, who was a great champion of wildlife preservation :—

He made great protection of the game,
And imposed laws for the same,
That who so slew hart or hind,
Should be made blind.
He preserved the harts and boars,
And loved the stags as much
As if he were their father.

William was a monarch, who could punish the offenders at will but in our democratic set up it is well nigh impossible to punish a culprit. Even serious offences, warranting immediate attention, are put to back burner with the usual promise that law will take its own course. And the course is so lengthy and circuitous that the culprits often go unpunished. Here, it is not to suggest that the offenders should be blinded or hanged, but the laws should be more stringent and effective. The Wildlife (Protection) Act of 1972 is no more than a piece of paper and so far has badly failed to deter the habitual offenders, with the result that incidents of killing wild animals are on the increase. Poaching inside National Parks and Wildlife Sanctuaries and killing of endangered species is going on unabated. Recent killings of two blackbucks and a chinkara near Jodhpur by a group of cine stars is a case in point. This heinous crime would have gone unnoticed, but for the strong voice raised by Bisnois, who have vowed to protect wild animals. They deserve all the kudos.

The approach of state wildlife organisation towards this murky episode has been rather lackadaisical. At first place there has been inordinate delay in apprehending the culprits, with the result that most of them got anticipatory bail. Many eye brows were raised on the statement made by the regional wildlife warden, "that the delay in apprehending the offenders was due to time taken in collecting evidence and secondly when influential persons are involved, one has to tread cautiously." This indeed is a sad commentary on our system. The so-called celebrities have been bailed out and now they are bound to influence the inquiry. And as if rubbing salt to the wounds, the main accused was accorded heroic welcome outside the gates of Jodhpur jail, where hundreds of boys and girls were waiting for his autographs. If this is our attitude towards the killers of wildlife, then God alone can save our wildlife.

This is not a singular case. Several incidents of killing wild animals take place daily in our country. But only a few are reported, quite a few are hushed up and rest go

प्रस्तावना

पक्षी आदिकाल से मानव-हृदय में भावों का उद्रेक करते आये हैं। आदि कवि बाल्मीकि के हृदय में काव्य की सृष्टि एक पक्षी के कारण ही तो हुई, जब एक बहेलिये के बाण से क्राँच पक्षी का वध देखकर अनायास उनके मुख से अभिषाप के कुछ शब्द अनुष्टुप छन्द में निकल पड़े थे। कहते हैं कविता का आरम्भ इन्हीं दो पंक्तियों से हुआ था।

मा निषाद प्रतिष्ठां त्वं अगयः शाश्वती समाः

यत्क्रौंच मिथुनादेकं अवधिः काम मोहितम्

अर्थात्:—हे निषाद, आने वाले किसी भी युग में तुम्हें प्रतिष्ठा प्राप्त न हो, क्योंकि तुमने काम मोहित क्राँच युगल में से एक का वध कर दिया है।

पक्षियों के जीवन तथा उनके रोजमर्रा के कार्यों पर जब हम ध्यान देते हैं तो हमारे भीतर यह भावना आप-से-आप उत्पन्न होती है कि हाड़-मांस के बने हुये ये पक्षी हम से किसी तरह भिन्न नहीं हैं—इनके भी हृदय और मस्तिष्क में हम जैसे ही विचारों की तरंगें उद्वेलित होती रहती हैं, सरस भावों की—निष्ठुर भावनाओं की भी। तब ऐसा लगता है कि पक्षी मानों हम से कह रहे हैं:—

हम प्राणी हैं हाड़-मांस के तुझ जैसे ही,
विविध भावनाओं का उर यह क्रीड़ास्थल है;
स्नेहासिक्त है हृदय हमारा, न्याययुक्त है,
किन्तु साथ ही जलता इसमें स्वार्थानल है।
वरस रही है दिव्य सरसता जहाँ-वहाँ ही,
निष्ठुरता भी हाथ बढ़ाये खड़ी प्रबल है।
मानव ! हम से नहीं श्रेष्ठ तुम यह सच मानो,
प्राणों में चैतन्य हमारे, मित्र प्रबल है।

पक्षियों को पिंजरे में बन्द रखना न उचित है और न न्याय संगत ही। जब कभी कोई पक्षी पिंजरे में कैद रहता है तो कभी वह फड़फड़ाता है और कभी करुणा भरी दृष्टि से इस तरह देखता है मानों कह रहा हो :—

हम स्वतंत्रता के जाये हैं, मुक्त हमें रहने दो,
जीवन की धारा में मानव, स्वेच्छा से बहने दो।

एक बार पिंजरा बद्ध होकर जब ये पक्षी पिंजरे से निकलकर बन्धन मुक्त होते हैं और उदास मन किसी वृक्ष की डाल पर बैठे होते हैं तो ऐसा लगता है, जैसे कुछ सोच रहे हों; ग़ालिब के शब्दों में इस तरह :—

छूटे असीर तो बदला हुआ जमाना था,
न वह गुल, न चमन, न वह आशियाना था।

—साभार “भारत के पक्षी”

राजेश्वर प्रसाद नारायण सिंह।

KEOLADEO NATIONAL PARK : A PROFILE

By

M.M. Trigunayat

Introduction :

Within the golden triangle of tourism (Delhi-Agra-Jaipur) lies a formerly Jat princely State of Bharatpur. It is the eastern most town of Rajasthan. Keoladeo ghana was created by one of the Maharajas of Bharatpur. In fact, he got inspired by a visit to Britain where he was invited for duck shooting by his royal hosts and after arriving here he created his own reserve for the same purpose so that he can in turn play host to the royal guests and Indian notables. As a result the existing marshland was deepened and extended to attract water fowls and later the tracks and dykes were constructed to make the area more accessible (Singh, 1982; Sankhla, 1990). Viceroy Lord Curzon inaugurated the first official duck shoot on December 1, 1902 in the company of Commanding-in-Chief, Lord Kitchner. The party shot 540 birds. The Viceroy and Governor General of India Lord Linlithgow was the top scorer who downed no less than 4273 birds in a day on November 12, 1938 (3044 birds were killed in the morning and 1229 in the afternoon), the world record of duck shooting (Sankhla, 1990). The last duck shooting took place in 1964-65 but Maharaja himself retained his personal shooting rights until 1972 (Israel & Sinclair, 1987). Thanks to the efforts of late Dr. Salim Ali and timely action of forest department of Rajasthan (Sankhla, 1990; Vijayan, 1994) that the duck shooting forest was declared as Keoladeo ghana bird sanctuary in March, 1956 under the rule 5 of the Rajasthan Wildlife Prevention Act, 1957 (Mathur & Saxena, 1968; Sehgal 1971; Singh 1982; Israel & Sinclair, 1987). The expert committee appointed by the govt. of India to study the status of wildlife conservation in Rajasthan too, in its report in 1970, strongly recommended that the sanctuary be upgraded as national park under section 35 of the wildlife protection act, 1972. Subsequently in August, 1981 under section 35 of the wildlife (Protection) act, 1972, it was declared national park, the Keoladeo National Park (K.N.P.), a magnificent marsh and haven for the birds. It is named "Keoladeo" after the name of a temple of lord Shiva in the heart of the park (Sankhla, 1990; Israel and Sinclair, 1987).

Geographical co-ordinates & location :

Keoladeo National Park (K N P) lies between 77° 29.5' to 73° 33.9' East longitudes and 27° 76' to 27° 12.21' North latitudes, (Ali & Vijayan, 1990). It is hardly 2 km south east of Bharatpur city, 38 km south west of Mathura and 54 km west of Agra. Delhi and Jaipur are almost equidistant.

Topography and soil :

The total area of the park is 29 sq. km. It is almost flat with a central depression of about 8.5 sq km and is the main submerged area of the park. Much of the area is bushy but it also contains semi arid woodland and scrub. It lies 370 metres above sea level (Israel & Sinclair, 1987). It is separated from the surrounding villages and agricultural fields by a boundary wall. The soil is alluvial and at many places the saline patches can be seen. In fact, Bharatpur was salt producing town and the salt production was banned in 1885 A.D. through a pact between Bharatpur State and the British government (Mathur & Saxena, 1968, Sankhla, 1990).

Climate :

Premonsoon season is hot and dry with as low as 30% humidity. The monsoon sets in the end of June and extends upto September when the Relative Humidity (R.H.) ranges between 70-75%. The winters last from November to February. The maximum temperature in summer ranges between 40-46°C and in winter around 29°C and the minimum temperature 21-23° and 3-5° in summer and winters, respectively. The average rainfall received in Bharatpur is approximately 495 mm but the droughts have become very frequent now a days. The overall climate is sub-humid to semi-arid.

Water maintenance :

The park is dependent partly on rainfall for the maintenance of its vegetation, lakes and marshes and partly on the supply of water through Ajan Dam, hardly 1/2 km away from the park. The water is drawn into the park through a canal and the dam itself is fed by the water of the rivers Gambhir through Pichuna canal and Banganga through Uchain canal (Gasquire, 1972; Mehta & Satyanarayan, 1979; Sankhla, 1990; Ali & Vijayan, 1990). The supply of water from both rivers is becoming increasingly deficient due to the growing human pressure for irrigation, uncertain and scanty rains and further the construction of Pachana dam on the river Gambhir has aggravated the situation. The park, therefore, needs an alternative source of water for its survival.

The Park and ideal seasons :

There are two special seasons to visit the park. First is the monsoon which is breeding season of many of its resident and local migratory birds. The other is winter when the long distance migrants come from thousands of kilometres from eastern Europe, Siberia and central Asia. They migrate with full accuracy to this tiny patch in the Gangetic plains unfailingly every year. The main migratory routes into India run down the valleys of the Indus in the west and Brahmaputra in the east, others fly straight over Himalayas or the Hindu Kush (Ali, 1979; Sankhla, 1990). Towards the south of park lies Koladhar where scrubs gradually thin out and give way to broad expanse of grassland with few groves of

mature trees, reed bed and further marsh. It is habitat of Black bucks, Larks, Buntings, Short toed eagles, Black winged kites, Heron and Egrets. The Open bill storks arrive first and soon the trees are full of variety of nesting birds such as Egrets, Herons, Cormorants, Ibises, Spoonbills and Painted storks. When the eggs begin to hatch the environs of the park is filled with noise of hungry nestlings and the parental activity multiplies. Fishing increases to a large scale with Cormorants and Egrets traversing the marshes in flocks, driving the fishes before them. Eagles and Harriers glide overhead, seeking opportunity for piracy (Sankhla, 1990). Once the nesting is complete and water level drops most of the birds fly out of the park to seek more plentiful sources of food in aquatic bodies elsewhere.

Flora :

The flora includes trees, shrubs, herbs, grasses, climbers and hydrophytes. The major trees include *Azadirachta indica*, *Acacia niolotica*, *Ficus bengalensis*, *Ficus religiosa*, *Mitragyna parvifolia*, *Pongamia glabra*, *Zizyphus sp.*, *Tamarindus indicus*, *Salvadora persica*, *Salvadora oleoides*, *Prosopis cineraria*, *Dalbergia* etc. (Israel & Sinclair, 1987; Sankhla, 1990, Vijayan, 1994).

The shrubs include *Capparis*, *Adhatoda*, *Argimone*, *Cassia*, *Lantana*, *Ipomea*, and *Calotropis* etc. The climbers like *Cuscuta*, *Tinospora*, *Cocinia*, the grasses like *Veteveria* (Khas) and *Cynodon* and the hydrophytes like *Azolla*, *Hydrilla*, *Typha*, *Nymphaea*, *Eichornia*, *Polygonum*, *Ceratophyllum* etc. are very common. As many as 392 species of angiosperms belonging to 254 genera and 81 families have been reported (Prasad, 1989, 90 & Prasad *et al.* 1996).

Fauna :

The park with rich and varied fauna is an important study centre for naturalists, ornithologists, entomologists and biologists. Though it is internationally known for birds but reptiles and insects too are the point of attraction to the visitors. The pythons, kobras, water snakes, rat snakes, monitor lizards and tortoises are common reptiles (Vijayan, 1987). The spotted deer, Sambar, Black buck, Blue bull, Jungle cat, Wolves, Fox, Jackals, Mongoose, Porcupines, Wild boars and Otters are common mammals (Vijayan, 1987). The insects like butterflies, odonates and beetles (Trigunayat, 1997) are other attractions along with a few amphibians. 28 species of butterflies have been reported from the park (Trigunayat, 1998). As far as avian fauna is concerned it has been rightly called 'birds Paradise'. As many as 369 species of the birds (WWF checklist) have been reported from the park representing almost all major orders (Sankhla, 1990; Ali & Vijayan, 1990). The description of some of the common species is given below.

Cranes :

This group requires urgent attention for protection and conservation. Of the world's 14 species, four are found here. Three of them are migratory and one the Sarus crane,

(*Grus antigone*) is resident. The Sarus crane is grey in colour with red head and face. (plate 3 fig. 3) They pair for life. The mutual devotion is very strong. If one member is killed the survivor also dies of broken heart. They gather in large numbers. 2 eggs are normally laid immediately after the monsoon and both parents share the duties.

Demoiselle crane (*Anthropods virgo*): Commonly called "Kronj", is seen in small numbers during the winter in the park. It is grey with black face, neck and breast with white ear tuft behind the eyes. The eyes are red and black, feathers of neck fall in long plume over its breast. It arrives in October in large numbers in India. They visit cultivated lands in the morning and evenings. They fly back to north in February or March and arrive south of Russia in early March.

Common crane (*Grus grus*) arrives in late October from its breeding grounds in eastern Siberia and Turkistan and fly back in March-April. It is a common winter visitor which has also been seen at Sultanpur lake (plate 3 fig 2) and along Chambal river (Sankhla, 1990).

Siberian crane (*Grus leucogeranus*): This is the main attraction of this park. Every year they cover around 6000 km distance from Siberia to Bharatpur probably because of the availability of food. Day light hours available to find the food get diminished as the Siberian winters set in and this probably becomes a compelling factor in instigating movements towards this place (from Siberia to Bharatpur) through Pakistan and Afganistan. It is one of the endangered cranes of the world. There are three populations of this species. The western population which breeds in the Ob river area in western Siberia (presently 8-14 birds) is at the verge of extinction. The eastern population which winters in China (Poyang river) is thriving fairly well with their number almost more than one thousand (Sankhla, 1990) and the central population of 3 birds that winters in India. KNP is the only known wintering ground for the central population of Siberian cranes. They come over here because perhaps the choice of vegetable matter such as *Cyperus rotundus*, *Scirpus tuberosus*, *Eleocharis duclis*, *Nymphoea* sp. *Scirpus littoralis* etc. (Sankhla, 1990) might be one of the factors. But the wetland with such vegetation elsewhere in north India are not wintered by these cranes except a few incidents, when one was reported in 1987 at Dihala Lake (M.P.) and in 1990 three were reported at Tablab Sahi (Dholpur). This crane is snow white in colour (plate 3, fig. 1) with face and legs brick red and black wing quills visible during flight. They are normally sighted in northern Pakistan at the end of October and late in November or early December they arrive at Bharatpur. They normally return to Siberia at the end of March or early April reaching their breeding grounds in May or in early June. Two eggs are laid and only one chick is raised and once again in early September they begin return migration to India.



Fig 1 Siberian crane.



Fig 2 Common crane.

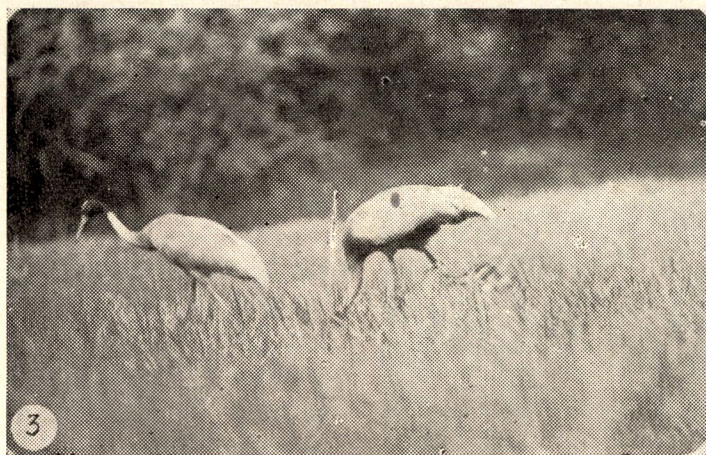
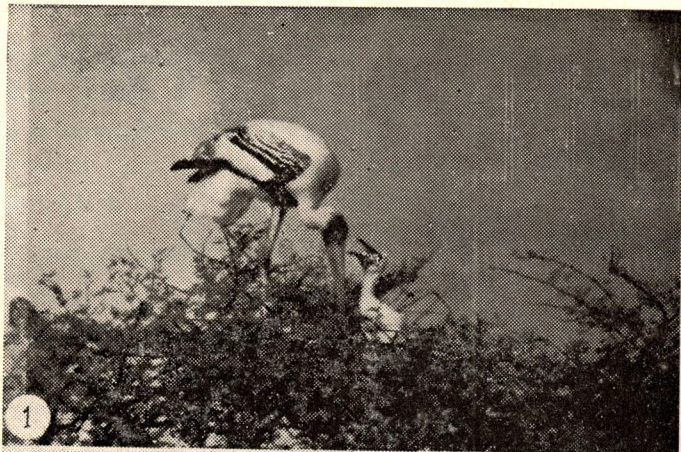


Fig 3 Sarus crane.



←Fig 1 Painted stork with chick at nest.



Fig 2 Black necked stork.



Fig 4 Open billed stork.

←Fig 3 Glossy ibis.

The number of cranes visiting the park have shown an alarming decline over the decades (Table 1). During 1964-65 about 200 birds were recorded at this park. Population has declined with the passing years : 76 in 1969-71, 61 in 1975-76, 33 in 1980-81, 37 in 1985-86, 10 in 1990-91 and 5 during 1992-93. The birds did not come to Bharatpur during 1993-94 and 1994-95 and were present again during 1995-96 (4 birds), 1996-97 (3 birds) and 1997-98 (4 birds) (Ali & Vijayan, 1990; Sankhla, 1990; Sharma and Meena, 1996; Daniel 1997).

Table 1

Wintering population of Siberian cranes in Keoladeo National Park (The number has been continuously declining to nil in 1993-94 and 1994-95)

Years	Numbers of Siberian cranes
1964-65	200
1969-70	76
1974-75	63
1975-76	61
1976-77	57
1977-78	55
1978-79	43
1979-80	33
1980-81	33
1981-82	38
1982-83	36
1983-84	37
1984-85	41
1985-86	37
1986-87	38
1987-88	31
1988-89	23
1989-90	17
1990-91	10
1991-92	06
1992-93	05
1993-94	Nil
1994-95	Nil
1995-96	04
1996-97	03
1997-98	04

Efforts of International Crane Foundation (ICF) and Govt. of India :

Efforts are being made to breed cranes in captivity at International Crane Foundation (ICF) Wisconsin (USA), Volgel Park (Walsorde, Germany) and Oka nature reserve (Russia) and more than a dozen of these birds have been hatched successfully from the eggs collected in the wild. In 1991, ICF successfully hatched and bred one Siberian crane in captivity by artificial insemination and incubation. A memorandum was signed in 1993 by five range countries (India, Islamic Republic of Iran, Kazakhstan, Pakistan and Russian federation) under the auspices of CMS (Conservation of Migratory Species of wild animals). The objectives was to save the central and western Asian population of this highly endangered species. Azerbaijan, Turkmenistan and Uzbekistan have signed the memorandum at the second range states meeting held at Keoladeo national park, Bharatpur in November, 1996.

Action Plan with following statements and objectives was drawn up.

1. To augment the wild population of Siberian crane in Keoladeo national park, release of conspecific and parent reared captive cranes.
2. Deployment of satellite transmitters on Common cranes and Siberian cranes for the purpose of tracking the migratory route and spring breeding grounds.
3. Deploy radio transmitters on Common cranes to study local movement in the park.

In 1992-93 Mini Nagendran of ICF and Sorokin (Russian scientist) released two artificially reared chicks, the "Bugul" and "White" in the park (eggs were collected from the breeding ground in Siberia and reared at ICF, Wisconsin, U.S.A.) with the objectives that the Siberian crane shall act as carrier or guide in the captive reared released stock on their return migration to the breeding grounds. If successful, more and more birds could be reared for the same purpose. However, the chicks did not mix or migrate back with the wild birds and were taken back into captivity. They were kept during all these years in separate cages at Jaipur zoo with provisions of coolers and grass pads. During January 1994, the "Bugul" and "White" once again were released in the park along with the company of four more artificially reared chicks from ICF and Russia (Boris and Gorby from ICF and Billy and Bushy from Russia) but unfortunately no Siberian crane did turn up this year and the juveniles did not show inclination to follow common cranes. Thus the experiment ended in a failure again and a decision, however, was taken to leave "Bugul" and "White" in park during the summer and remaining other chicks at Jaipur zoo. To the great surprise "White and Bugul" could tolerate the summer temperature range of 44°-46°C at Bharatpur. Unfortunately "White" died of injury inflicted by bill of some of other birds (Black necked stork or Sarus crane) on 9 July, 1994 and Bugul was hurriedly shifted back to Jaipur Zoo. Bushy too, died of haemorrhage on July 22, 1994 at Jaipur Zoo. The post mortem report stated haemorrhage as the cause of death. Bugul, Boris Gorby and Billy were brought back to the park in October, 1994. Regular observations were made on energy and

time budget, home range, adaptability to semi-arid climate and habitat utilization etc. They were last sighted inside the park on 13th November, 1994, 20th November, 1995, 20th January, 1996 and 15th February, 1996, respectively. Forest department had sent search parties to all the nearby wetlands but none of them could be located. God knows what happened to them. Some experts explained this disappearance as "expected" (?)

India hosted the second range States meeting at this park. All except Afghanistan attended the meeting and drew up an action plan.

India Action Plan for 1997 :

1. Release of four captive Siberian cranes at Keoladeo national park for public education and research purposes, also to consider deployment of PTT (Permanent Translocatory Transmitters) to one captive reared bird, bonding with wild flock, if established.
2. Monitoring of captive reared Siberian cranes released in the park with the aid of mortality sensor radio telemetry and carry out health evaluation research at periodic intervals.
3. To study alternative wintering areas within India and migratory route, attachment of PTTs to one juvenile and one single adult.
4. Carry out migration study with PTTs on two identified Eurasian crane populations in Assam to document alternative fly way for possible reintroduction of captive reared Siberian cranes with this flock in their breeding areas.
5. Collaborate with scientists of Russian federation in PTT studies on captive reared Siberian cranes released with the central flock in Russia and associating Indian scientists.
6. Develop and promote active crane conservation related education and awareness programme to cover the former wintering areas of Siberian cranes in India.

Just after this meeting, 3 adult Siberian cranes were reported on the morning of 16th November, 1996 in F block of the park.

Dr. Julie Langenberg on 29th January, 1997 brought 4 adult captive bred birds to the park. They, Baharami, Ayuafat, Annbur (all females) and Alkonost (male), were released in the K and E blocks of the park (Map-2). It was hoped that the captive reared Siberian cranes released into the wild would adapt themselves to their new surroundings and have enough opportunity and time to interact with the wild Siberian cranes so as to safely return back with them to the breeding grounds. But on 18th February, 1997 all wild birds left for their breeding grounds in Siberia except the captive bred and experiment once again failed. According to the reports (August 1997) out of four captive reared Siberian cranes released in 1997, one was found dead, two others had wandered to the areas outside the park and were located in the Azan dam area leaving only one bird in the park. Later they returned

to the park in October, 1997. In November 1997 also, four Siberian cranes arrived in the park. But they did not mix up with these birds and returned to Siberia in March 1998 leaving the experiment once again incomplete. According to the latest reports (July 1998) Annbur (female) also died of some unknown injury. Her body organs like kidneys, brain and liver were sent to C.B. Patel Institute, Bombay for testing and both Alkonost and Bahrani have disappeared from the park. Thus, the future of the central population of the Siberian crane appears to have run in jeopardy.

Storks

Of the world's 17 species of storks, seven have been recorded at this park. Four are very common. Except the White stork (*Ciconia ciconia*) which is common visitor from middle east and atleast in part of Europe, all are resident and local migrants.

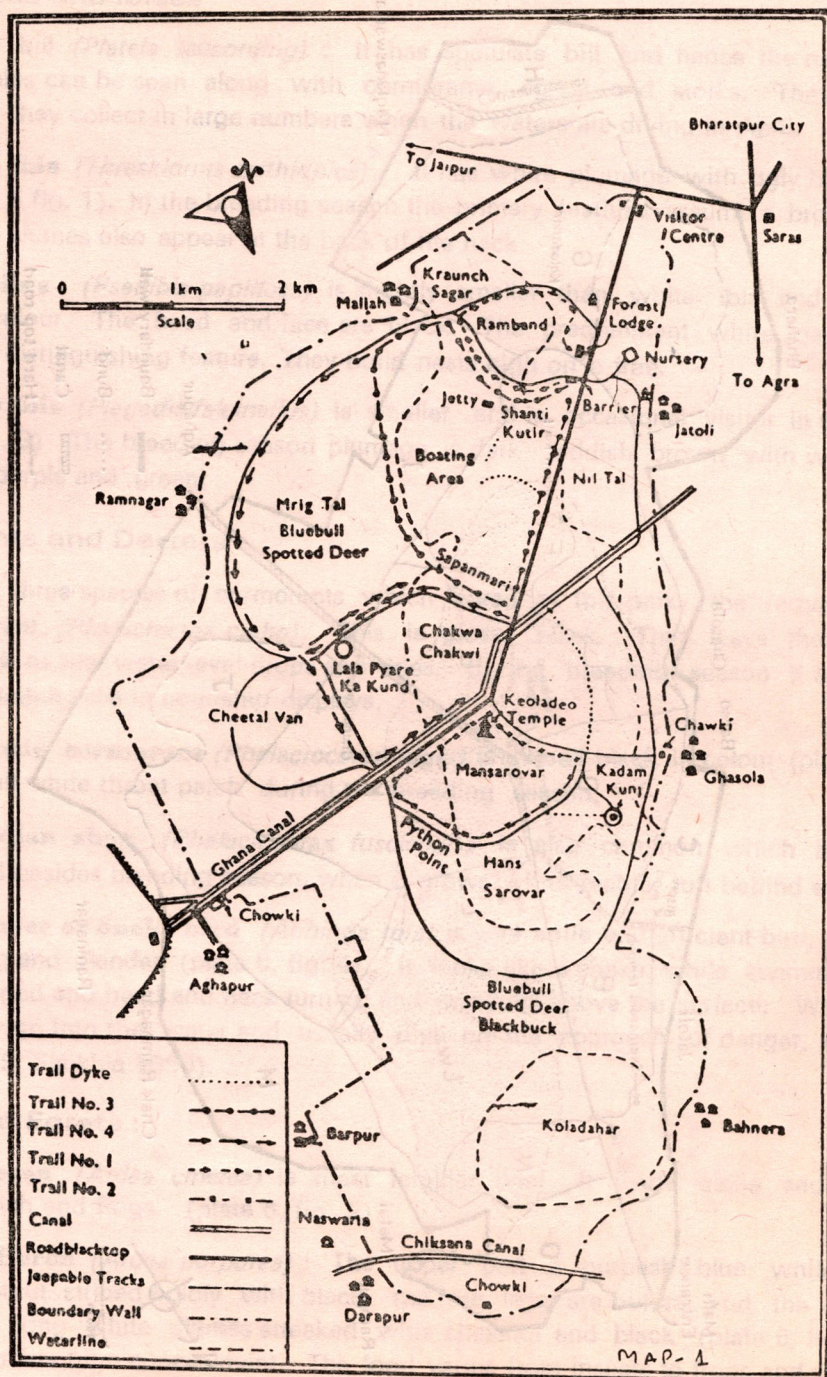
Painted stork (*Mycteria leucocephala*): Thousand of nesting pairs can be counted in the park. The chief nesting trees are babul (*Acacia nilotica*). The breeding season continues throughout monsoon as abundance of fish is available for food. 2-4 eggs are laid which hatch out within a month of incubation.

Open billed stork (*Anastomus oscitans*): They do not stay in the park all round the year. They arrive in May and June and are first to start nest building. The mandibles are arched leaving a gap between them and hence the name openbill stork. This open bill is helpful in breaking the shell of molluscs (Pila), its favourite food. The habit of the birds is to regurgitate some quantity of water over its eggs, perhaps to maintain humidity in the nest or to keep them cool (Sankhla, 1990).

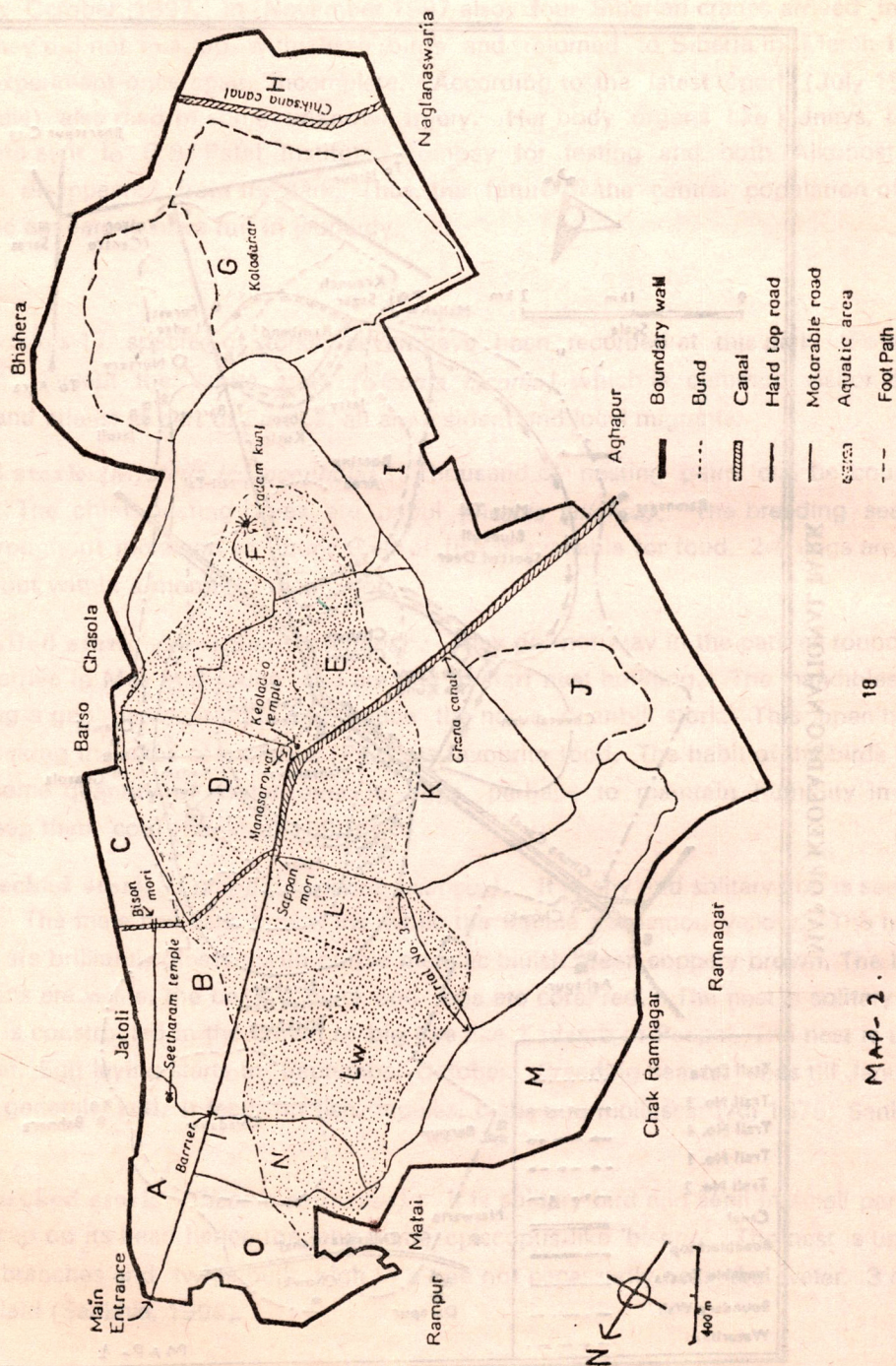
Black necked stork (*Ephippiorhynchus asiaticus*). It is shy and solitary and is seen in one or twos. The male has dark brown iris while the female has lemon yellow. The head, neck and tail are brilliantly glossed with purple metallic bluish green coppery brown. The back and under parts are white, the beak is black and legs are coral red. The nest is solitary and massive and is constructed in the crown of big tree like Kadamb or Peepal. The nest is used year after year. Egg laying starts in September-October. Breeding season ends till January. 3-5 eggs are generally laid. It feeds on fish, reptiles, crabs and molluscs (Ali 1979; Sankhla, 1990).

White necked stork (*Ciconia episcopus*): It is solitary bird and seen in small parties. It has black cap on its head hence the latin name episcopus-like 'bishop'. The nest is untidy structure of branches and twigs built high in a tree not necessarily near the water. 3 eggs are normally laid (Sankhla, 1990).

MAP OF KEOLADEO NATIONAL PARK



MAP OF KEOLADEO NATIONAL PARK SHOWING DIFFERENT BLOCKS AND
SURROUNDING VILLAGES



Spoon bills and Ibises

Spoon bill (*Platela leucording*) : It has spatulate bill and hence the name spoonbill. Their colonies can be seen along with cormorants, egrets and storks. They lack vocal apparatus. They collect in large numbers when the waters are drying in April.

White ibis (*Threskiornis acthiopica*) : It has white plumage with ugly black head and neck (plate 5 fig. 1). In the breeding season the primary feathers assume a brownish colour, tuft of long plumes also appear at the back of the neck.

Black ibis : (*Pseudibis papillosa*) is slightly smaller than white ibis and is dark olive brown in colour. The head and face are black. The predominant white patches on the coverts is a distinguishing feature. They build nests high on a tree.

Glossy ibis (*Plegadis falcinellus*) is smaller and is occasional visitor in small groups. (plate 4, fig. 3) The breeding season plumage is dark reddish brown with wings and tail glossed in purple and green.

Cormorants and Darters :

Of the three species of cormorants which breed at this park, the largest in size is large cormorant, (*Phalacrocorax carbo*). This is glossy black. They leave the park by the end of March as the water level drops and dries. During breeding season it also develops white thigh patch seen in courtship displays.

The Little cormorant (*Phalacrocorax niger*) is overall black in colour (plate 5, fig. 3). It grows small white throat patch during the breeding season.

The Indian shag (*Phalacrocorax fuscicollis*) is also common which is not easily distinguished besides breeding season, when it grows white feather tuft behind eyes.

The Darter or Snake bird (*Anhinga rufa*) is very agile and efficient bird. Its head and neck are long and slender (plate 5, fig. 4). It looks like a snake while swimming with its body submerged and head and neck turning and swaying above the surface. When alarmed, it straightway go into the water and usually dive on the approach of danger. 4-5 eggs are laid (Ali, 1979; Sankhla 1990).

Herons and Egrets :

Grey Heron (*Ardea cinerea*) is most familiar one. It feeds alone and wades in marshes for fish and frogs. (plate 6, fig. 2).

Purple Heron (*Ardea purpurea*) : The upper part is purplish blue while the under parts are chestnut striped boldly with black, the fore legs are white and the upper breast covered with long white plumes streaked with chestnut and black (plate 6, fig. 4). This combination offers high concealment. The food varies from insects to frogs and fish.

The Night Heron (*Nycticorax nycticorax*) : It is crepuscular in habit with short legs and thick bill. It is grey above and under parts are white (plate 7, fig. 2). The head and back is glossy black. They can be seen roosting on trees near the keoladeo temple or elsewhere in the park near the water edge.

Paddy bird (*Ardeola grayi*) : It is called Pond Heron. It is very common bird which is snow white during flight while the body colouration is a blending of various shades of brown streaked with buff. (plate 6, fig. 3). In breeding season white or buff crest appears on the head.

Large egret (*Egretta alba*) : It is tall snow white bird which is solitary in nature. The bill is yellow and legs black. In breeding season bill turns black and the legs yellow. (plate 7, fig. 3).

The Median egret (*Egretta intermedia*) : It is more common and gregarious.

Little egret (*Egretta garzetta*) : has black bill and yellow feet. In breeding season it develops ornamental plumes on the breast and back and long plumes on the head. This species was largely slaughtered earlier in this country for the famous "aigretts", an item of female fashion (Sankhla, 1990).

Cattle egret (*Bubulcus ibis*) : It is snow white with yellow bill and black feet. In breeding season it develops golden buff plumage on the head, neck and back. It is found in the company of grazing cattle feeding on insects they harbour on them or they disturb on the ground while grazing (Sankhla, 1990).

Geese :

The Greylag geese and Bar headed geese (plate 8, fig. 1 & 2) are the common visitors. Both arrive in October or November and fly back by the end of March through across Himalayas. Thousands of geese can be seen in the park during the season. In the evening they fly out of the park to feed in the neighbouring fields on winter crops and cause damage to these crops. The Grey lag geese breeds in Kazakistan, Siberia and Manchuria while the Bar headed breeds on the high lakes in central Asia, Laddakh, Tibet, western China and Mangolia (Sankhla, 1990). The geese are among the most powerful fliers in the avian world.

The other water birds which throng the marshes include Coots (*Fulica atra*), Pheasant tailed jacana (*Hydophasianus chirugus*) (plate 11, fig. 2), Bronz winged jacana (*Metopidius indicus*), Moorhens (plate 11, fig. 3) and White breasted water hens. The jacana are polyandrous.

Ducks :

Since the park was developed as duck shooting resort by the Maharaja of Bharatpur, therefore, this group of birds has been its major attraction although their number is



Fig. 1 White ibis.



Fig. 3 Little cormorant.

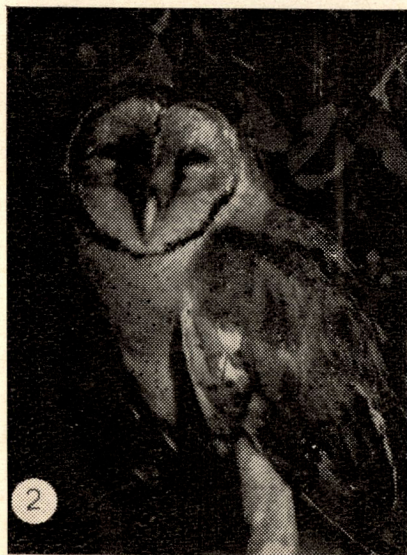


Fig. 2 Large Barn owl.



Fig. 4 Darter.

Fig. 1 Spoon bill.



Fig. 3 Pond Heron

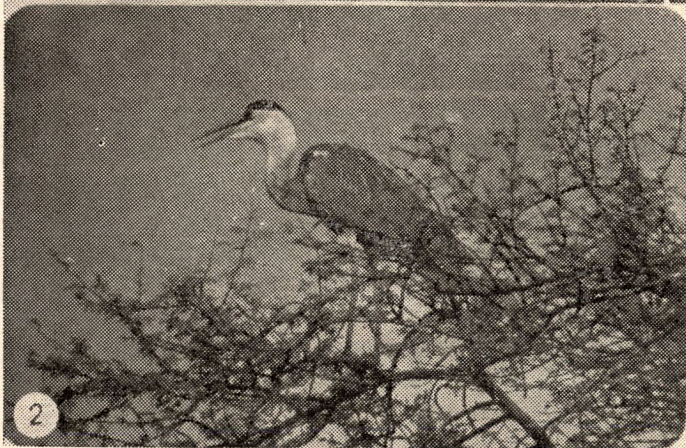
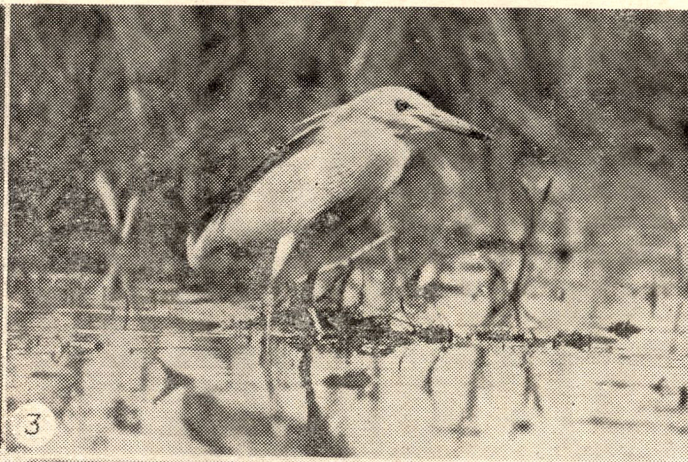


Fig. 2 Grey Heron.

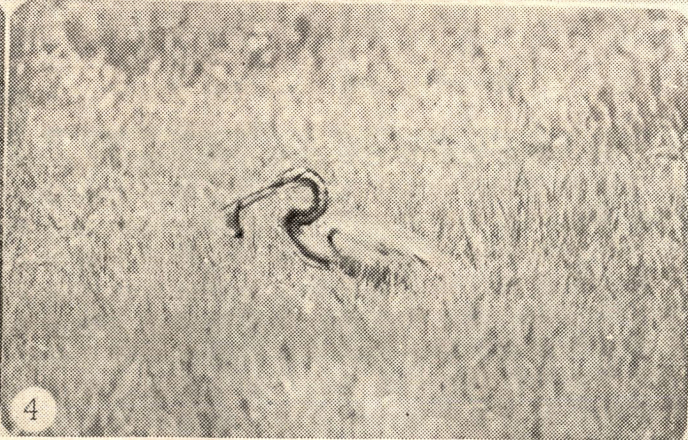


Fig. 4 Purple Heron holding a fish.

Fig. 1 Chicks of Cattle egrets at nest.



Fig. 2 Night Heron (female)

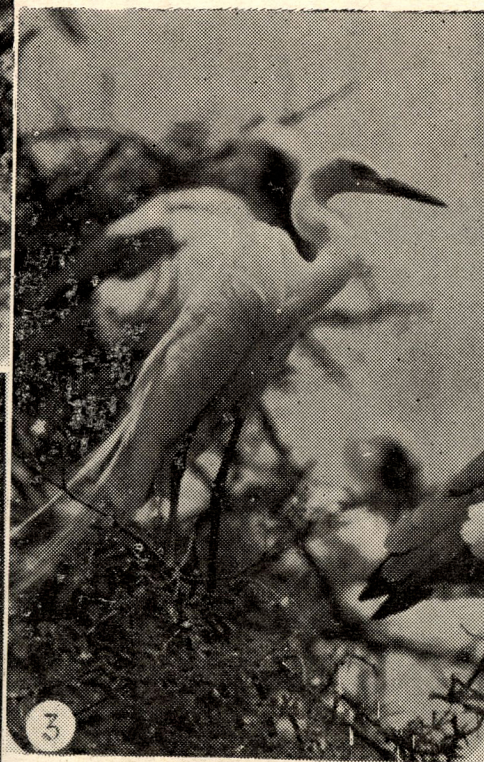


Fig. 3 Large egret in breeding plumage.

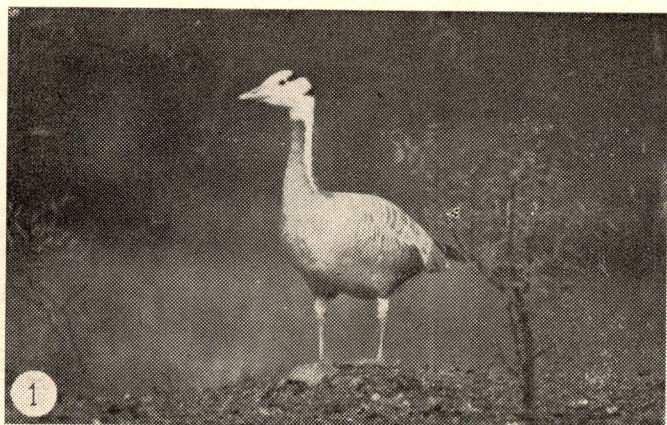


Fig. 1 Bar headed goose.



Fig 2 Greylag goose.

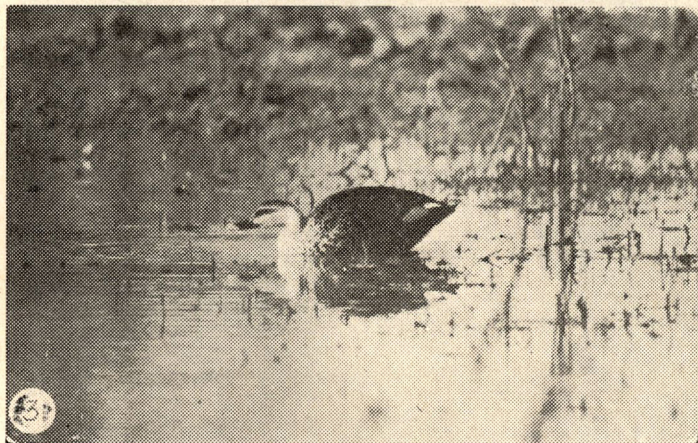


Fig. 3 Spot billed duck.

continuously declining. The flocks arrive in winters and resident species inhabit all round the year. They migrate across Himalayas from Kazakistan and Soviet union, south and east of Caspian sea, central Asia and Siberia. Following are some of the common ducks of the park.

Rudy shelduk (*Tadorna ferruginea*), **Common shelduck** (*Tadorna tadorna*), **Marbled teal** (*Marmaronetta angustirostris*), **Common teal** (*Anas crecca*), **Whistling teal** (*Dendrocygna javanica*), **Falcated teal** (*Anas falcata*), **Gargney teal** (*Anas querquedula*), **Shovellers** (*Anas clypeata*) (plate 11, fig. 1) **Wigeon** (*Anas penelope*), **Red crested pochard** (*Netta rufina*), **Common pochard** (*Netta ferina*), **Mallard** (*Anas platyrhynchos*), **Pintail** (*Anas acuta*) etc. The ruddy shelduck or Brahminy duck commonly called Chakwa-Chakwi, is a large attractive orange brown duck with buff head and neck. It is winter visitor. It breeds in Tibet and Laddakh and further north in central Asia to the east Mangolia and China. The common shelduck is uncommon visitor and rarely seen. The Pintail ducks arrive in large numbers in winter from Caspian sea and Siberia. Marbled and Falcated teal are very rare, the Mallard though winters in Kashmir, are scarce. Of the resident ducks, the Spot billed duck (*Anas poecilorhyncha*) and Comb duck (*Sarkidiornis melanotos*) are common. The male has a comb on its bill hence the name Comb duck. The Spot bill duck possess a red spot on each side of the base on the black bill and its tip is yellow in colour (plate 8, fig. 3). The smallest of ducks is Cotton teal (*Nettapus coromandelianus*). It is a perching duck and makes nest on the trees.

Pelicans

The Rosy pelican or White pelican (*Pelecanus onocrotalus*) is a winter migrant. Its breeding areas ranges through middle east to the lakes of central Asia. The *Grey pelean* (*Pelecanus philippensis*) is rare visitor to park. It is grey in colour and the pouch is dull purple. The Dalmatian pelican (*Pelecanus crispus*) is winter visitor to park and migrate from eastern Europe, Turkey, southern Russia and central Asia. It is grey in colour with orange pouch and yellow breast.

Flamingos :

The Greater flamingo (*Phoenicopterus roseus*) is long legged and long necked bird which stands about 4 ft. high. It is rosy white in colour with curved pink bill with black tip. It breeds in Rann of Kutch (Ali, 1979). Small flock of flamingos can be seen here before the mansoon when the water is very low and brakish. It feeds on crustacean, molluscs and organic particles. The method of feedings is curious. It inverts the head and immerse in the water, its angled beak filters out food particles through the strainer along the margin of its bill.

Raptors :

The Bengal vulture (*Gyps bengalensis*) or White backed vulture is most common in the park. The King vulture (*Torgos calvus*) is solitary or found in one or twos. Egyptian vulture or Neophron called 'Pharaoh's chicken' is potent scavenger of carrion, garbage and human excrement.

Four species of eagles, the Fishing eagle, the Short toed eagle (plate 13, fig. 2), the Lesser spotted eagle (plate 12, fig. 1) and Tawny eagle are the resident in the park whereas the Crested serpent eagle (plate, 12, fig. 3) is local migrant.

The Greater spotted eagle, Imperial eagle, Steppe eagle (plate 12, fig. 2) are common winter visitors.

The Marsh Harrier (*Circus aeruginosus*) is winter migrant from Europe and Mangolia. It arrives in September and leaves the park by the early April. It feeds on the birds like coots, moorhens, pond herons, water ducks, frogs and small mammals and even insects of order Orthoptera.

The Indian sparrow hawk (*Accipiter nisus*) descends to the plains in winter from Himalayan habitat.

Owls

The Spotted owlet (plate 13, fig. 3) and Dusky horned owl are the most common. The Dusky horned owl (Jungli ghughu) (plate 5, fig. 2) is one of the largest owl. They can be seen at the Kadam Kunj and elsewhere in the park. The Colloard scops owl can be easily seen near the Keoladeo temple under thick foliage. Eight species of owls from the five genera have been recorded in the park.

Kingfishers (plate 15) :

Five species of Kingfishers, Lesser pied king-fisher, White breasted kingfisher, (fig. 1), common blue kingfisher, (fig. 2), Stork billed kingfisher and Black caped kingfisher are found in the park. Pied kingfisher (fig. 3) is black and white which can be identified easily. It is always watchful in the vicinity of water on a unsuspecting fish. It hovers at the same place like a helicopter. White breasted kingfisher is very prominent with blue, brown and white coloration and massive bill. The food comprises of insects, fish, water snakes, rodents and other small mammals.

Threats and management Issues : Some of the threats identified by Bombay Natural History Society after completing its 10 years Ecology Project were as follows :—



Fig 1 Spotted eagle



Fig 2 Steppe eagle.

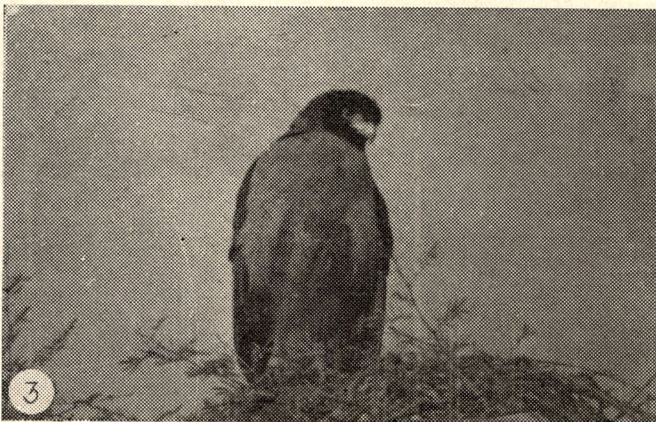


Fig 3 Crested serpent eagle.



Fig 1 Pallas fishing tail eagle.

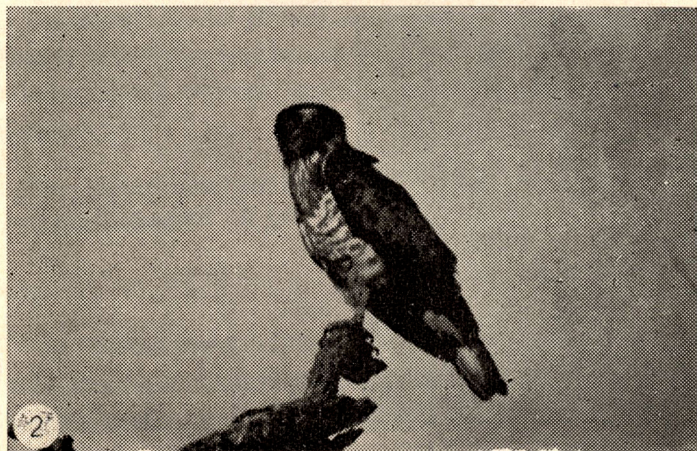


Fig 2 Short toed eagle.



Fig 3 Spotted owlet.

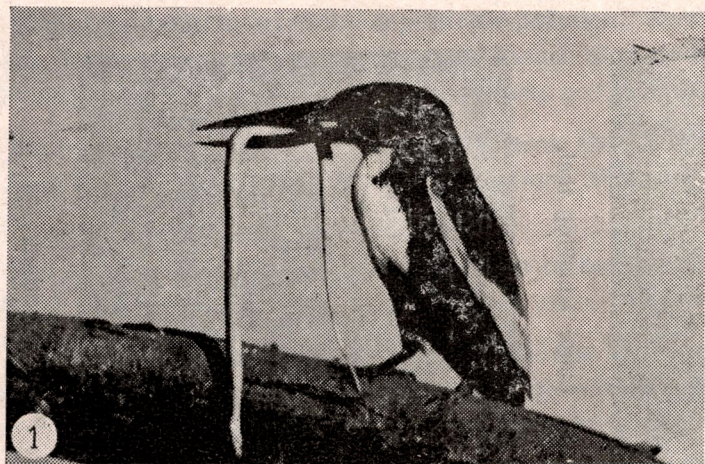


Fig 1 White breasted kingfisher holding a water snake.



Fig 2 Little blue kingfisher.



Fig 3 Pied kingfisher.

Photographs-Courtsey Kailash Navrang



Fig 1 Shovellers.

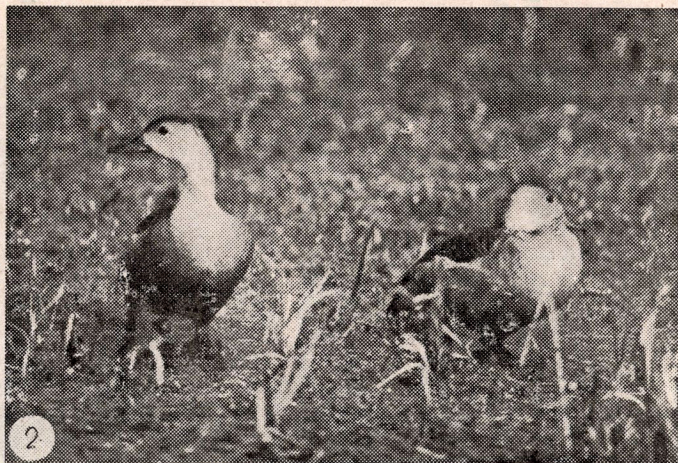


Plate 10 Fig 2 Large whistling teal.

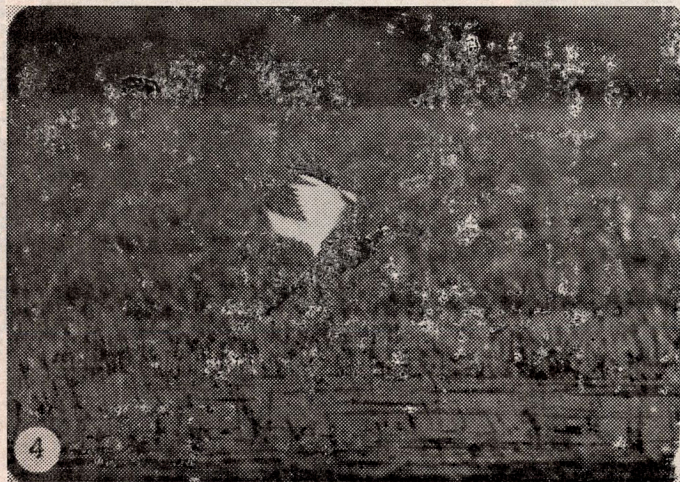


Fig 4 Pheasant tailed jacana.

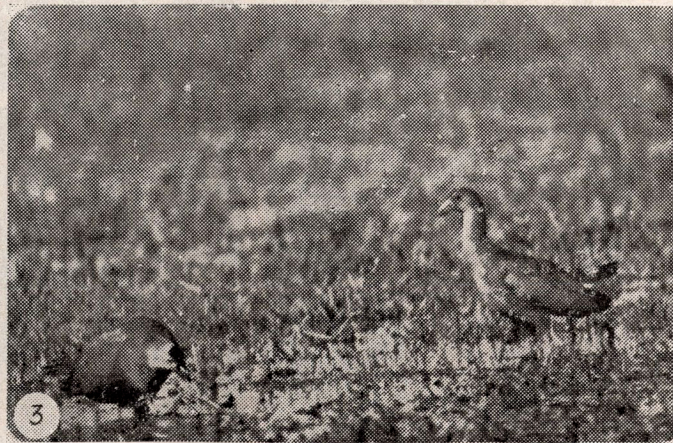


Fig 3 Purple moorhen.

Plate 11 Photographs-Courtsey Kailash Navrang

1. One of the major threat includes pesticide pollution. dieldrin, Aldrin, BHC, DDT and Heptachlore have been reported in the various tissues of many birds viz. Sarus crane, Ring doves, Grayleg goose, Darters, Grey Heron, Spoonbills and Moorhen (Vijayan, 1990).

2. Because of the scanty and uncertain rains the rivers supplying water to park through Azan dam are getting inadequate and therefore, alternative source of water is need of the hour.

3. The aquatic vegetation like water lily needs to be controlled as it is combating with the habitat of wild fowls.

4. The practice of Khas Itra (Vetiver) extraction has been stopped when the sanctuary was upgraded to park, therefore, this grass is growing upto 2 metres height, causing alternations in the habitat of Black bucks which prefer comparatively low grassland.

5. Feral cattle population is increasing causing competition with wild ungulates.

6. The Mathura refinery is hardly 32 km away from the park therefore, the emissions and gaseous discharge may be a potential threat.

7. There are more than 10 Brick kilns near the periphery of the park and resulting smoke may have an adverse affect on the fauna.

Mathura refinery has already set up monitoring centre at the park to assess the air quality. Brick kilns now have been banned legally and many of the feral cattle were captured and transported to be released in Chambal ravines near Dholpur. For a decade or so the human interference has been increasing in the green belt area of the park as the hotel trade has flourished and it may have its own unseen implications to be seen in future.

Research activities : Presently BNHS is continuing a project on Raports. The Bombay Natural History Society (BNHS) has completed project (1980-90) on the Ecology of Keoladeo National Park and conservation education project (CEP).

Management :

Forest department, govt. of Rajasthan has set the following objectives for the park management.

- * To maintain the ecological seral stage of this ecosystem by arresting the process of plant succession at the stage suited to bird life.
- * To protect and maintain ideal habitat conditions for a diverse spectrum of birds and animals inhabiting the park.
- * Monitor the ecological changes taking place in the ecosystem and take restorative action.
- * Tourists satisfaction by providing enlightened wilderness experience through conservation education packages without disturbing the ecosystem.

Following practices are being undertaken by the park administration in order to achieve the above objectives.

Water management

By August-September park is filled upto its maximum water holding capacity. The distribution of the water in different blocks is kept at varying levels so that the specific water requirement of each bird species is taken care of. Different blocks are flooded in a definite sequence. LW and L blocks are filled first—followed by E, F, D, B, K and N blocks. Blocks B is filled in two spells of flooding. Initially the water level is kept between 20 and 25 cms and afterwards all other blocks are filled and the levels raised to 120 cm. This is done to provide feeding habitats for early breeders like Egrets and Open billed storks. In blocks F, K, E and L (the habitats of Siberian crane) the flooding is done in such a way that the interface between wetland and terrestrial habitats retains water for about 30 cm upto December-January. Drying up of the area during summers is very essential. When the water is adequate, one draining is done in October and the final in March. During May-June water is kept at a minimum level except in deeper pools.

Habitat Management :

After an incident of firing between police and nearby villagers the cattle grazing was banned in 1982 which has resulted into profuse growth of grasses like *Paspalum distichum*. Following management practices are being used—

* **Bulldozing** : Certain areas are bulldozed, as a result the growth is suppressed. It is effective upto two years.

* **Manual Cutting** : Since 1991 the grass permits are issued to the villagers for a period of 8 months at nominal rates. Submerged grass is pulled out, dried and taken away by the villagers and used as fodder. Quantification of grass representing head loads and estimated cost benefits are represented (Table 2). During summers it is removed by cutting.

* **Controlled Burning** : It has been tried on an experimental basis. This method has merits and demerits of its own. It is beneficial as the nutrients are recycled into ecosystem whereas harmful due to the burning of micro organisms.

Cyperus alopecuroides is being removed by bulldozing. It is heaped and burnt later on. *Vetiveria zizanoides* was managed by collecting roots for khus oil extraction until 1981. Presently it is being controlled by allowing villagers to take away the grass, extraction of slips (used in soil conservation measures), burning and bulldozing. *Prosopis juliflora* and *Acacia nilotica* are being controlled by manual extraction. Gap plantation is done with indigenous plant species like *Syzygium cumini* (Jamun); *Zizyphus mauritiana* (Ber), *Mitragyna parvifolia* (Kadamb) and *Salvadora persica* (Piloo).

Eichornia crassipes (Water hyacinth) is very troublesome. It is drifted from Azan dam and is very fast growing weed. It requires manual removal.

Table 2

Quantification of grass utilisation by villagers

Year	Permits Issued	Wet weight of grass (qt.)	Head loads	Estimated social benefit @ Rs. 0.50 kg. (Rs. in lacs)
1996	5,490	98,820	2,29,400	49.41
1995	3,848	69,264	2,30,880	34.63
1994	4,692	84,456	2,81,520	42.22
1993	2,761	49,698	1,65,660	24.84
1992	2,131	1,27,860	38,358	19.17

(Adapted from forest department, govt. of Rajasthan.)

INDIA-USSR Pact On Migratory Birds :

More than 300 species and sub-species of birds migrate between India and USSR. While their breeding grounds lie mainly in Russia, their flyways, wintering, feeding or moulting areas are entirely in India and neighbouring countries. Among these migratory birds are species which are rare or are in danger of extinction.

To protect these birds, India and USSR have formulated a treaty. The treaty will mark the culmination of efforts initiated ten years ago following a suggestion made by late Salim Ali, the renowned ornithologist.

The treaty will prohibit taking of the "birds of passage" or their eggs except for scientific, educational and other specific purposes. It provides for special measures by India and USSR for the protection of the endangered species and for the setting up of sanctuaries for preservation and improvement of the environment of specified birds. Under the treaty, the two countries will exchange data and publications pertaining to research on such birds and promote joint research programmes.

Besides protecting the migratory birds and preserving their environment, the treaty will advance the cause of birds biology in both countries, lead to better exchange of information and research and help the conservation movement (Khacher).

Acknowledgements :

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BIRD STUDY IN INDIA : ITS HISTORY AND IMPORTANCE*

By

Late Dr. Salim Ali

PERHAPS a brief historical review of bird study in India from ancient times up to the present may help to provide a correct perspective. I am not aware of any ancient treatises on Indian birds, as such, which describe their attributes and external characters in sufficient detail to permit their identification with certainty, except perhaps in the case of the commoner species that figures prominently in mythology, legend or folklore—such as crow, parakeet, koel, peacock, and some others. In any case a direct assessment of their worth as 'scientific' text would be beyond me since I am no scholar of Sanskrit or Pali. However, the English translation of the Sanskrit text of a book *Mrign-Pakshi-Sastra* or 'Science of Birds and Animals' by Hamsadeva, said to be a Jain author of the 13th century A.D.—the only work of this kind known to my friend Shri Harinarayan Acharya of Ahmedabad, himself an erudite Sanskrit scholar and a competent ornithologist—is not impressive. Its bizarre descriptions, often comically vague and amusing, perhaps rendered more so by the translator's special brand of English, are not very revealing. For example, what is ostensibly meant to be the Saras Crane is described as follows: "They are very tall, having long legs, red beaks and white bodies. Their stomachs and rear portions are stout. Their wings are broad and big. They are a little impatient when they are hungry. They eat small fish, fruits, lotus trunks and roots and others. They often dive in water and play. They generally enjoy during nights. They fly in the sky with their couples. They perch on the cool trees at the time of wearisome-*sic*. They are much afraid of the roar of lions and tigers and they run away to distant places. They are fond of swimming even in the floods and they have smooth feathers. They have a little passion."

The other sources of information regarding Indian birds of the pre-Moghul period are the several lexicons of Sanskrit words, though these are not very helpful in identifying the species either. Some names are based on calls, i.e. they are onomatopoeic like *Kaka* for the crow (which says 'ka ka'); others are based on colourations, habits, gait, method of feeding, and so on. Some names are identifiable easily enough, while others are obscure. Perhaps the only person who has attempted to identify birds from such Sanskrit names was the late Dr. Raghuvira in his publication *Indian Scientific Nomenclature of the birds of India, Burma and Ceylon*, 1949. With varying—often dubious—success he identifies some 250 Sanskrit words with known species of Indian birds. Some of his conclusions, however, are

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distinctly farfetched ! Classical Sanskrit literature occasionally makes specific mention of Bird Migration, as for example the migration of geese (hamsa)—wrongly rendered as 'swans' by many commentators—to lake Manasa (Manasarovar). The poet Kalidasa, a close observer of bird behaviour—described the migratory habits of two species of geese, Raja-hamsa (Barheaded) and Kadamba (Greylag) as accompanying the rain clouds on their way from the Vindhya to the Himalayas.

The Indian Koel and its habit of brood parasitism was well known to the Vedic seers, and described unambiguously in Sanskrit literature. Interestingly enough this appears also to be the earliest record of avian brood-parasitism, since it was described many centuries before Aristotle (384-322 B.C.) or his immediate colleagues or predecessors began to write about the European Cuckoo.

The Moghul Emperors, at least from Babur to Shah Jahan, were renowned aesthetes and lovers of Nature in all its forms. Among them the two most outstanding naturalists were Babur and his great-grandson Jahangir. Some of the accounts they have left behind of the habits and behaviour of the birds that came under their personal observation are so apt that they could scarcely be bettered for incisiveness and scientific accuracy today. What is more creditable about these royal naturalists is that they do not rely on mere hearsay but make a clear distinction in their writings between their personal observations and what has been reported to them by others. For instance, while describing the Monal Pheasant, Babur writes with subtle humour "A remarkable circumstance is told of them. It is said that in winter they come down to the skirts of the hills, and if in their flight one of them happens to pass over a vineyard he can no longer fly and is taken." He then continues "God knows the truth. Its flesh is very savoury." Mark here the clear distinction between what God knows and what the Emperor can personally testify !

The outstanding features of Jahangir's character were his love of Nature and his powers of observation. It has been rightly said of him that had he been head of a Natural History museum he would have been a better and happier man. His *Memoirs* are replete with observations on birds and other animals written with an accuracy and insight that would do credit to a modern student of bird behaviour and ecology. He has, for instance, some extremely useful and interesting notes on the breeding habits of the Saras Crane from the time of their pairing onward and till the eggs were hatched, that are in complete accord with present day knowledge. Jahangir established and patronized a school of animal painting at his court headed by the famous Ustad Mansur, honoured by the Emperor with title of Nadir-ul-Asr. Whenever an unfamiliar or exotic bird or beast was brought to him, Jahangir first studied it carefully for its characteristics before describing it in his *Memoirs*. Immediately thereafter he caused it to be painted by Ustad Mansur or one of his school to serve as supporting illustration. Since the Emperor's reputation as a lover of birds and animals had spread far and wide throughout the world, foreign emissaries accredited to the Moghul court vied with one another to bring him as *nazar* or *peshkash* the strangest and rarest birds and beasts

from their respective countries for the Imperial menagerie. In this way was built up the unique collection of exquisite animal portraits which, on the disintegration of the Moghul Empire gradually got scattered and, largely through loot and skulduggery, found its way to unexpected and far-flung corners of the earth. Among the bird portraits attributed to Ustad Mansur, but which is certainly the handiwork of one of his school and period, is a painting of a Siberian or Great white Crane. At the present time this crane is one of our rarest and most endangered species with a total world population of perhaps no more than 250 individuals. A significant section of this population, 70 birds or so, visits the Keoladeo Ghana Bird Sanctuary of Bharatpur every winter between November and March to add to the glory of this priceless natural wetland. The interesting point about this painting—fortunately still in the collection of the Indian Museum, Calcutta—is that it was executed between the years 1616 and 1620 A.D. and thus nearly 160 years before the bird was actually 'discovered' and described for western science (in 1773) by the Russian zoologist Pallas from the swamps bordering the Obe and Irtysh rivers in USSR ! Another bird painting, a miniature, of Jahangir's period and though unsigned and undated clearly of the Mansur school has the unique distinction of being one of the only two drawings ever made from life of the Mauritius Dodo (*Raphus cucullatus*, L.) which became extinct in 1681. The portrait is considered by experts to be the most scientifically accurate one in existence of that flightless pigeon-like bird which first became known to Europeans in 1598 and was so completely exterminated in less than a hundred years by the hungry sailors of visiting ships and the rats and domestic animals introduced by them on the island. This remarkable painting had lain in oblivion in the Institute of Orientalistics of the USSR Academy of Sciences until stumbled upon by Dr. A. Ivanov of the Leningrad Zoological Museum. He brought it to the notice of ornithologists gathered in Helsinki for the 12th International Ornithological Congress in 1958 and caused quite a sensation. Strangely enough, and contrary to his usual practice, there is no mention of the dodo in Jahangir's Memoirs, and whence and how the living specimen came to be available for painting seems a mystery. A plausible explanation has been suggested by me elsewhere (in Alvi, M.A. & A. Rahman 1967, *Jahangir the Naturalist*). Jahangir's *Memoirs* ended in 1624, three years before his death. The dodo must have come into Jahangir's possession and been painted during the blank period and hence it unfortunately finds no mention in the chronicle. It is on record that two live specimens of the Mauritius Dodo were kept at the East India Co.'s factory in Surat where the chronicler, Peter Mundy first saw and described them in 1628, i.e. 11 months after Jahangir died. It seems more than likely that the miniature represents one of these same birds. Or it could even be that there was a third bird in this batch which had been presented to Jahangir by the Surat Factory before his death as an ingratiatory gesture, knowing the Emperor's passion for strange and exotic creatures.

Foreign adventures and travellers to India in the closing years of the Moghul Empire, towards the end of the 18th century and the beginning of the 19th, had carried back with them as novelties from time to time to various European museums small collections of the skins and eggs of Indian birds. Sporadic collections had also been assembled by servants

of the East India Company for its own museum in Calcutta in various newly purloined territories of the insiduously expanding British Indian Empire. But scientific ornithology, more or less as understood today may, for practical purposes, be said to commence with the publication of the two volumes of Jerdon's classic *Birds of India* between 1862 and 1864. In this work the author bestowed an English name on all the birds of India largely based on British analogies. While many of them are reasonably appropriate, others have gone through numerous attempted improvements by successive authors. It is to be hoped that English nomenclature has at last attained near-stability with the latest publication, the 10-volume Handbook of the *Birds of India and Pakistan* by Salim Ali and S. Dillon Ripley, 1968-73. The standardization of vernacular bird names for all-India use still remains an urgent need in order to satisfy the demand for popular bird books in the regional languages.

One of the earliest of the 'modern' accounts of Indian birds was actually published in 1713 by Edward Buckley, an East India Company surgeon in Madras, with descriptions and drawings of 22 birds found in and about Fort St. George. Several other bird collectors and writers followed during the rest of the century, many of whom have left their mark on Indian ornithology either by describing newly discovered birds, or having such novelties named after them, and in other ways. The first serious attempt at recording the avifauna of a definitive region in India in a scientific journal (*Proc. Zool. Soc., London*) was a paper in 1831 by Capt. James Franklin, a geologist who had undertaken expeditions in the Central and United Provinces to study the rocks in the Vindhyan Hills, and incidentally to collect birds for the Asiatic Society. He collected some 200 birds of 156 species, of which 30 he described as new.

Among the early writers on Indian birds before the publication of Jerdon's *Birds of India* another specially notable one was Col. W.H. Sykes who came out to India in 1803 aged 13, and believe it or not, received a commission in the Bombay Army. He saw a great deal of service in the Mahratta wars, and collected birds in the Bombay Deccan. His well-known paper 'A Catalogue of the Birds of the Deccan' was published in the *Proceedings of the Zoological Society, London* in 1832. He described a number of new species many of which he named after Hindu deities such as *Milyus govinda* for the Pariah Kite, *Hippolais rama* for a Tree Warbler, *Patrocinchla pandoo* for the Blue Rock Thrush, *Hypsipetes ganeesa* (after Ganesh) for the Southern Black Bulbul, and others. There were several other similarly active field workers, mostly civil or military officials, in the employ of the E.I. Co. scattered widely over different parts of the country during the first six decades of the 19th century. But the period was dominated by the virtual Founders of Indian ornithology, namely Brian Houghton Hodgson, (first assistant British Resident and later Resident, at the court of Nepal between 1840 and 1844), Edward Blyth the Curator of the Asiatic Society of Bengal's museum, Calcutta from 1841-62—whose writings did more for the extension of natural history studies in India than any other—and Thomas Caverhill Jerdon, a surgeon in the Madras Army of the East India Co's establishment. John Gould, the taxidermist of the Zoological Society, London,

was the first to make known birds from the Himalayas from a small collection of skins he had acquired between 1825 and 1830. Most of the birds were new and Mrs. Gould made drawings of them which were described by N.A. Vigors and published in *A Century of Birds from the Himalayan Mountains* in 1832. In 1849 Gould commenced a sumptuous elephant folio work of coloured lithographs, *Birds of Asia*, but died before it was completed, and Dr. Bowdler Sharpe was responsible for the 7th (final) volume which came out in 1883.

Jerdon's *Birds of India* epitomizes the knowledge up to that period based largely upon the publications of these and several other illustrious field naturalists, and on the vast collections of skins made by them and their numerous correspondents and proteges scattered over the Company's territories. In the latter part of the 18th century, and even till well into the 19th, taxidermy was still in its infancy, and instead of making a collection of stuffed skins it was the custom in India to employ local artists to make paintings of birds. The tradition of life-like animal portraiture set by the Jahangir school was still very much alive. Many collections of bird paintings were thus made, e.g. those of General Hardwicke had Francis Buchanan-Hamilton, and some of them became famous because of the many new species that were described on their basis in lieu of actual skins. In 1844 Jerdon himself had published a selection of 50 lithographs with descriptive letterpress entitled *Illustrations of Indian Ornithology*. The originals of these were drawn by Indian artists, and half the number were also lithographed and painted in Madras. It was noted at the time that 'Their excellence and the faithfulness of the drawings has been universally allowed.'

The publication of *Birds of India* at once gave a marked impetus to bird study in the country, but was still almost entirely restricted to Europeans. It found new devotees among British officials, planters and professional men some of whom in turn were soon to become prominent names in Indian ornithology. The period thence, and right up to the publication of the first edition of the Bird volumes of the India Office sponsored. *Fauna of British India* series by Oates and Blanford, was completely dominated by that extraordinary personality, Allan Octavian Hume who had meanwhile appeared on the scene. Apart from his other great intellectual and humanitarian qualifications, Hume's special claim to be remembered in India lies also in the fact that he was one of the original founders of the Indian National Congress, and this while still in the civil service of the Government of British India. He has with good justification, been called 'The Father'—and by those who were irked by his occasional dogmatism 'The Pope'—of Indian ornithology. He collected methodically and intensively, himself as well as with the help of his numerous correspondents and proteges widely dispersed over the country, chiefly, between the years 1870 and 1885, and thus brought together a collection that has doubtfully ever been equalled in magnitude in any branch of zoology or botany. It totalled some 60,000 skins of birds, in addition to a very large number of nests and over 16,000 eggs, all of which he later presented to the British Museum. Hume founded and edited a journal of Indian ornithology with the somewhat eccentric title of *Stray Feathers* between 1872 and 1888. Its 11 volumes containing papers by some of the

more upcoming ornithologists of the time, written under his energetic guidance, and much of it by himself, are a veritable gold mine for the ornithologist and an eloquent memorial to the zeal, erudition and versatility of their remarkable editor. In *Stray Feathers* Hume has described a large number of novelties discovered during the period, and this work is indispensable for any serious study of Indian birds.

Hume was a facile and prolific writer and his pungent criticisms of contemporary ornithologists and ornithological trends and his *experto crade* pronouncements on bureaucrats and their inanities, are often amusingly interlarded with puckish humour. His account of the hare-brained introduction "by our beneficent Government anxious to succour its suffering people from rats" on some of the inhabited islands in the Laccadive (Lakshadweep) group; and the fate of "a lot of snakes and mongooses" that had first been sent down to deal with the rodents followed by a lot of Wood Owls when the latter took to the coconut trees for escape, and in turn the doom of these unfortunate owls cast upon unforested coral shores in totally incompatible ecological conditions and under strong superstitious objections from the islanders. "Unfortunately" continues Hume slyly, "as is too commonly the case in India, popular prejudice interfered to mar the success of a paternal Government's beneficent schemes". In upshot the birds soon came to an end but not the rats! The account is too long to be quoted here in all its amusing details, but to any one who is interested in Hume or in Indian birds, or even in convincing himself that bureaucracy hasn't changed, I would strongly recommend a reference to volume 4 of *Stray Feathers* (pp. 433-4).

When *Stray Feathers* ceased publication, in 1889, most of its former contributors as well as other workers who had come into prominence meanwhile, diverted their writings to *The Ibis*, the journal of the British Ornithologists' Union and to the *Journal of the Bombay Natural History Society*. The last, which made its debut in 1886 has maintained unbroken publication since then. It is now in its 75th volume and has become increasingly important in disseminating knowledge of Indian birds. It enjoys considerable scientific prestige internationally and is recognized as the foremost natural history publication in Asia. Indian ornithology received its second definitive boost after Jerdon by the publication between 1889 and 1898 of the 4 volumes on birds by Eugene W. Oates and W.T. Blanford in the *Fauna of British India* series. Like its predecessor this work brought together, and up to date, all the advances in knowledge resulting from the extensive researches done in field and museum during the intervening 27 years. This renewed filip was clearly responsible for producing the rash of outstanding field ornithologists that distinguished the next 33 years up to the publication of Vol. 1 of the second edition of the *Fauna of British India* series on Birds—the New Fauna for short—by E.C. Stuart Baker, himself an illustrious product of that period.

The six main volumes of the *New Fauna* were completed in 1930. They in turn showed up many lacunae in our knowledge, especially concerning the areas in the subcontinent imperfectly explored or not at all, such as the Eastern Ghats and the territories of many of

the princely states. This generated a series of regional ornithological field surveys organised or sponsored by the Bombay Natural History Society, which resulted in significant advances in our knowledge of the ecology, systematics and distribution of Indian birds.

A feature of the years, particularly between the two World Wars and since the end of the Second, is the increased emphasis on bird watching and ecological study in India as distinct from specimen collecting. This has been facilitated, among other things, by the availability of well illustrated books on Indian birds for identification in the field and by the great improvement in technology and optics—in binoculars, cameras, telephoto lenses, also fast films, colour photography and sound recording—all essential tools for serious field work.

All the new accretions to knowledge have found their place in the latest work—the 10-volume *Handbook* referred to earlier—along with a great deal of other data collected by several keen Indian ornithologists who had surfaced in the intervening 40 years since the *New Fauna* appeared—and especially, since our Independence. The two most outstanding British ornithologists specializing in Indian birds in the period up to 1943 were Dr. Claud B. Ticehurst and Hugh Whistler, the former a Captain in the R.A.M.C. during the first World War, who had spent a couple of years in what is now Pakistan, and the latter an Imperial Police Officer in Punjab for a number of years. Since the untimely death of these two veterans—Ticehurst in 1941 and Whistler in 1943—the British era of Indian ornithology had virtually ended. Most of the work thereafter has been done by Indians a few of whom have come into international prominence. A distinguished exception is my colleague and co-author of the *Handbook*, the American Dr. S. Dillon Ripley, now Secretary of the Smithsonian Institution, Washington. Dr. Ripley has been closely associated with Indian ornithology and Indian ornithologists for over 30 years, both in the field and the museum, and in collaboration with Indian colleagues has undertaken several expeditions and made, and continues to make, important contributions to knowledge.

Why Preserve Birds ?

Well-meaning laymen are shocked at the perversity of those who advocate the protection and conservation even of such birds and wild animals as often cause considerable damage to food crops, fruit orchards forest resources and in other ways, and are thus manifestly inimical to man's interests. Since grain-eating birds attack standing crops in broad daylight, and hawks may occasionally purloin a chicken or two from the poultry yard, their criminal mischief is clear for all to see, and sufficiently self-condemnatory. Thus many birds are arbitrarily singled out for capital punishment and laymen are convinced that if only these 'vermin' were eliminated all would be well for the poor cultivator and his concerns. It seems to them as simple as that. Against this notion there are those who after careful study and objective assessment maintain that but for birds the world would perish, because without their unrelenting check on insect numbers no plant life would be possible, or the animal life dependent on it including Man himself. How can these two conflicting

views be reconciled? That there is much truth in the latter view is evident from the facts. Over 50,000 species of insects have been described from the Indian subcontinent, doubtless with many more still to come. Many of them, such as locusts, beetles, moths, caterpillars and termites, are extremely harmful pests of agriculture and forestry upon which our national economy leans so heavily. The rates of reproduction in insects are truly astronomical. In America it has been computed that a single pair of the Colorado Beetle (*Leptinotarsa decemlineata*) would without natural checks—in which birds play an important part—increase to 60 million in a year. This insect belongs to a family (Chrysomelidae) that is prolifically represented in India. The fecundity and voracity of locusts both in the wingless hopper stage and as flying adults is well known. They lay eggs in the soil, each female laying several capsules or egg masses of 50 to a hundred eggs each. On a S. African farm of 3300 acres no less than 14 tons of eggs have been dug up, estimated to have produced 1250 million locusts. Locusts swarms, often covering up to 300 square km. and consisting of hundreds of million insects, are sometimes so thick as to obscure the sun, and when on the ground may hold up railway traffic by causing the wheels of locomotives to slip on the tracks. A visitation of such proportions will, in the course of a few short hours, reduce a smiling green tract of hundreds of hectares into a desolate waste of bare stems. White storks and Rosy Pastors and many other birds are traditional predators and take relentless toll of locusts throughout the year although their activities may make little apparent dent at the time of actual swarming.

A large proportion of the normal food of the majority of birds consists of insects. Some idea of the vast extent of their beneficent activities may be obtained from the fact that many young birds in the first few days of their lives consume more than their own weight of food in 24 hours. Even those species that are predominantly granivorous as adults feed their nest-young almost entirely on soft bodied protein-rich insects till they are fledged. Birds have phenomenal appetites. The energy required for flight is generated by their rapid digestion and the efficiency of their metabolism. Birds of Prey, such as the hawks and owls, often unjustly accused of delinquency and slaughtered out of hand, are amongst the most important of Nature's checks on rats and mice, the most fecund and destructive non-insect pests from which man and his works suffer. Rats have a staggering reproduction potential. They produce 6 litters of an average 8 young per annum, and begin to breed when $3\frac{1}{2}$ months old. Hypothetically this means that if the progeny was of equal sexes, and all the young survived, a single pair would increase to 880 rats by the year's end! As is well known, these rodents are responsible for the destruction of between 10 and 25% of our entire food crops annually, either in the field or as stored grain. A scientific investigation undertaken in the rice growing tracts of the Indus Delta in Lower Sind before partition—in 1926—revealed the annual damage caused by the Sind Mole Rat (*Gunomys sindicus*, now *Banicota bengalensis* kok) in that area to be between 10 and 50% of the total crop and of the order of Rs. 23 lakhs. And that was at a time when paddy was selling at 12 kg. per rupee,

again believe it or not ! Owls and the diurnal birds of prey are some of Nature's most important controls on rodent populations. The food of the larger owls consists chiefly of rats and mice. It has been found that a single such owl takes 2 or 3 rats per night. Every two rats destroyed hypothetically means a potential suppression of 880 rats annually. And considering that this good work is carried on for 365 nights in a year with no strikes and no paid holidays, and not by a single owl but by the entire local population of owls, some idea of the untold good they do may be obtained.

Another of the more important activities and impacts of birds on our national economy, which has not yet been properly appreciated or studied, is their role in the fertilization of flowers and the dispersal of seeds, and thus on the character of our indigenous flora and natural vegetation. Many species of birds are adapted morphologically by the structure of their bill and tongue for a diet of nectar, and are in a great measure responsible for cross-pollinating certain flowers' as they are popularly known—to promote cross-pollination in the process of nectar seeking by the bird visitor. It may not be generally known that the large showy rosy red flowers of the semal or silk cotton tree (*Bombax ceiba*), which carry generous supply of nectar, are largely dependent on birds for their fertilization and thus for the natural regeneration of the semal tree, and the sustained yield of the principal basic soft wood for our flourishing safety match industry, which has an annual turnover of several crore rupees. A good example of beneficial seed dispersal by frugivorous birds is the mulberry (*Morus alba*) tree first planted on the banks of irrigation canals in the desert areas of Punjab as a sand-binding and anti-erosion measure. The birds took to the fruit avidly and returned the bounty by broadcasting the seeds in their droppings far and wide, creating abundant natural regeneration of the mulberry tree and showing the way for commercial plantations. Mulberry wood constitutes the principal raw material for the thriving sports goods industry for which Punjab has become famous. In 1967-77 India exported over Rs. 2 crore worth of sports goods, such as cricket bats, hockey sticks, tennis and badminton rackets and other items, to the benefit of our Foreign Exchange reserves. The Sandalwood tree (*Santalum album*), one of the major revenue producers in Karnataka State, also owes its natural abundance to the broadcasting of its seeds by frugivorous birds.

It must be conceded, however, that like most good things in life, the activities of birds are also double-sided. On the debit side of their accounts must be entered in bold letters their highly negative role in the propagation of noxious weeds, either by fertilizing their flowers such as of the ornithophilous mistletoes (of the plant family Loranthaceae) or by the dispersal of their undigested viable seeds, as also those, for example, of the pernicious Lanthaceae) or by the dispersal of their undigested viable seeds, as also those, for example, of the pernicious Lantana weed. The mistletoes—locally known as 'bandha' or 'karazdar'—are plant parasites that infest orchard trees like mango or guava, and valuable timber stands such as teak and sal. By boring its roots into the tissues of the host-tree and sucking the sap—its life blood—the parasite reduces bearing capacity in the former case, and retards

normal growth of wood in the latter, causing considerable economic loss to fruit grower and forester alike. The thousands of square kilometres that have been overrun and rendered unproductive by the Lantana, though a comparatively recent exotic plant introduction, owes largely to the appeal of its lavishly produced berries to fruit-eating birds.

Birds often pose problems other than the direct harm they sometimes do to Man's food resources and allied concerns which, however, they largely compensate, by their counter-vailing beneficent services. For instance, they unwittingly act as hosts of Zoo parasites, both internal and external, or as carriers of vectors of pathogenic viruses of Man and his livestock, and disseminate them across the world in the course of their migratory wanderings. In recent years a further cause for their indictment has arisen, namely the increasing hazard they pose to aviation. This has become a serious worldwide problem with the development of fast flying jet aircraft. In spite of considerable sophisticated research in all advanced countries no permanent solution is yet in sight. In India it is chiefly kites and vultures that are responsible for causing serious 'birds strikes' or direct collisions with aircraft, frequently resulting in fatal crashes. Small birds occasionally get sucked into the air intakes of jet engines necessitating extremely expensive repairs or even the complete scrapping of costly engines. Whether birds deserve the blame for such mishaps, or Man himself for trespassing into the birds' pristine domains, is of course, a matter of opinion !

However, taking all things into the reckoning, there is little doubt that the good birds do far outweighs the harm, and they, therefore, deserve the most stringent protection. It is a hackneyed common-place, nevertheless only too true—and more so in this increasingly material age—that Man does not live by bread alone. By the gorgeousness of their plumages and the loveliness of their forms, by the vivaciousness of their movements and the sweetness of their songs birds typify Life and Beauty. Verily they number among those important trifles that supplement bread in the sustenance of Man and make his living worthwhile. And to close this plea on behalf of the birds, and for their protection and conservation, I can do no better than quote the introductory remarks of a world renowned biologist the late Sir A. Landsborough Thomson, Chairman of a symposium held in London a few years ago on 'The Problems of Birds as Pests'. He said, 'Birds are to a great extent economically beneficial; they are also, of course, scientifically interesting and aesthetically delightful. Yet some species tend to be harmful, and others become pests when present in excessive numbers or in the wrong places. Our task is, dispassionately and objectively, to determine the facts and consider what to do.'

BIRD WATCHING, AN ALL-TIME HOBBY

By

I.S. Negi, I.F.S. (Retd.)*

THERE is an old Hindi couplet which reads as, "Azgar kare na chakri, panchhi kare na kaam; Das Maluka kah gaye, sabke data Ram". This is a grossly erroneous statement regarding birds. On the contrary birds are a hard working lot. For their size they expend tremendous amount of energy in carrying out their daily chores. The house crow (*Corvus splendens*) can be seen bending half a dozen, 1/8th inch thick steel wire pieces to reinforce its nest. The meticulously weaved nest of baya, the weaver bird (*Ploceus philippinus*) is a classic and speaks volumes of hard work put in by the male partner to attract its fiancée. Birds spend most of their time in feeding and rearing their chicks. They are the only faunal life which have to water their infants along with food (the young ones of mammals meet their water requirement from mothers' milk). The life of birds is in fact a saga of toil.

There are 27 natural orders of avian fauna in this world, out of which 21 are found in India alone. These are further divided into 75 families and approximately 1200 species of birds. This, in fact, is a very high number and represents a great variety for a single country. The richness of avian fauna can be attributed to a great diversity of climate and vegetation found in India, ranging from moist tropical to cold alpine of the Himalayas; the dry hot deserts of Rajasthan to rain forests of North-East India provides dense jungle, open scrubs, cultivated land, sea shores, lakes, river beds, rocky cliffs and snow covered mountains. All these offer invigorating habitats to please the taste of hundreds of bird species. In fact birds in India are a splendid cross section of the total bird population of the world. Most of the bird species are resident throughout the year, while some are migrants and come to spend the winter months.

In Alpine forests the swift flights of Himalayan Cock (*Tetraogalus himalayensis*) and Dafia Monal (*Lophophorus impejanus*) make a spectacular sights. Come down a few thousand feet to temperate oak forests and you cannot miss the dusk to dawn song of nightjar (*Caprimulgus asiaticus*) and the gurgling call of koklas (*Pucracia macrolopha nepalensis*) will wake you up early in the morning. The semi-arid scrubs of Agra and Etawah are swarmed with Titar (*Francolinus pondicerianus*) and Biter (*Coturnix coromandelica*) even to-day. The great Indian bustard which used to roam about the grassy land and open scrub of Gujarat and Rajasthan may soon become a piece of museum. The world famous Keladeo bird national park, Chilka lake of Orissa, Salon lake of Raibareli harbour large flocks of migratory and resident birds, mostly ducks, teals, cranes etc. According to recent studies the population of water fowls in these lakes is on the increase which is a very healthy sign.

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In India the area is so vast and flora and fauna so diverse that its proper study and description will require life time effort and world of fortune. But one does not need to go far and wide to study the bird life. There is plenty of avian fauna around you and every where. What one needs is a keen eye and sound memory. The easiest and most popular method of studying and identifying birds is bird-watching. Bird-watching is a hobby which can be practised every where and all the year round. The pleasure it affords is subtle and compelling; not only is it relaxing, but is also a healthy and stimulating pastime.

In old days ornithologists resorted to shooting and collecting birds for identification and classification with the help of shikaries and trappers (Bahelias). Birds thus shot or trapped were stuffed and kept in museum for the benefits of those who wanted to pursue the taxonomic study of birds. This primitive method of studying avian fauna in museums and laboratories has now been replaced with more authentic method of bird watching and studying living birds in their natural habitat and collecting precise information about their habitat, habits and behaviour. From the specimens of museum and laboratory one cannot know how and where the birds live, how they get adapted to their environment, how they acquire their mates, how and what type of nests they make, how they bring up their young ones, their population dynamics and social organisation. This and much more is now possible by bird watching with modern means and improved scientific equipment.

In order to acquire a working knowledge of bird watching it is essential to possess three items of equipment, i.e., a pair of binoculars, a note book and a reference book for identification. If you possess a camera with zoom lens and can photograph the birds, it will be an added advantage, as a few pictures are worth pages of description. The most suitable size of binoculars for bird watching is 8×30 or 7×50 . Birds are easy to identify and define as they are the only feathered creatures on earth. In order to identify a bird it is important to make sure as to what one has seen, i.e., colour, shape and size of the body, legs, bill, tail, underparts etc. However it is not possible for a bird watcher to note so many things at first sight and several attempts will have to be made to mark all the prominent characteristics, such as hopping, particular way of flying, chirping, preening etc. of a bird. It is also necessary to write down at once what one has seen and observed. For this a note book and a pencil is needed. Birds use a variety of sounds, calls and positions to communicate. The American Wood Cock for example, uses at least 10 different calls to communicate. Bird watchers can trap these sounds in a tape-recorder, since such facilities are now available.

With a little more practice, even an amateur bird watcher will be able to broadly identify and put unknown birds within their families. He/She will soon know about the movements, habitat, feeding habits, places of nesting etc. He will find the world of birds so engrossing that a small time interest will get built into a delightful long time hobby.

Apart from aesthetic value it is important from economic point of view to know about food and feeding habits of birds and assess their status as friends and foes of mankind. Utility of birds as friends of man is a well known fact. In an agricultural country like India birds play an important role in the pollination of flowers dispersal of seed and keeping insect pest under control. It is said that a single pair of Colorado beetle could multiply to 60 million in a year if birds did not keep check on these pests.

At the same time birds themselves do a lot of damage to agricultural crops, often resulting in food shortage in an over populated country like ours. We should be aware of this damaging aspect of birds as well.

Preservation of race is one of the three principal natural instincts of all living beings. This instinct is highly pronounced in birds. Bringing up a family successfully is most anxious business in birds. Right from making a nest, choosing a mate, nesting, rearing nestlings and releasing them in the air, the whole process is fraught with hazards. A nesting bird family is in an extremely vulnerable position. Predators such as crows, owls and snakes take a heavy toll of eggs and nestlings. Nevertheless, birds perform this onerous task of nesting carefully, meticulously and with precision. They will choose a nesting season when they can be sure of liberal supply of food. They will make a nest at a place which provides maximum safeguards against predators. This reminds me of an incident when a red whiskered bulbul (*Pycnonotus* spp.) made her nest on a flowering tree at one corner of my lawn. But the house crow destroyed the nest and ate away the eggs. My compound was a pretty safe place for nesting but not against house crows. After losing two of its broods, the bulbul shifted her nest on an *Aurocaria bedulii* plant kept in a pot at one corner of my front verandah. Though serious disturbance was caused in the verandah by playing children and movement of incoming and outgoing people, the bulbul considered it a safer bet and successfully produced three to four broods. The spiny leaves of *Aurocaria bedulii* deterred the house crow from approaching the nest.

Watching birds during breeding season is a memorable experience. On the commencement of breeding season the male birds put on colourful plumage (a bunch of coloured feathers) and acquire musical sound to attract the females. They also exhibit a peculiar behaviour during mating season. Some male birds become romantic, while others especially fowls and pheasants become bold and arrogant and even ignore the outside danger. The males of fowls and pheasants mark a territory for themselves and zealously guard the same. They fight off the intruding males and keep them at bay. Sometimes the fight becomes so intense and indulging that the duo get dangerously exposed and are often shot dead by the shikaries. Wood partridge (*Peura*) is the smallest partridge and is found in oak forests at elevation of 6000 to 8000 feet. In breeding season, for gaining favour of the female, the males fight so ferociously that they just do not care for the presence of human beings, so much so that one can hand lift both the warriors alive.

Another interesting feature of birds is courtship display when the male tries to win the heart of females. The peacock dance and wooing (guttur goon) of pigeons is a common sight. Male doves can be seen dancing attendance on females. Parakeets exhibit different postures and brilliant plumage to females.

After the courtship pairs are made for building nests. The process of building nests, sometimes by both male and female, at times either by male or female and further incubation of eggs and feeding chicks is interesting and rejoicing. In some cases the work of incubating eggs and feeding chicks is shared equally, while at others either the female or the male does bulk of the work:

Contrary to the proverbial belief that birds are free and safe in the sky, their life is full of risks. Cats, lizards, snakes, crows, other predator birds, storm and wind take heavy toll of eggs and chicks. Hawks attack birds in mid-air. In spite of all the hazards, the urge for reproduction is so strong in birds that when the nest or the chicks are destroyed, the parents waste no time in mourning and immediately start building new nest. Parents feed the chicks so well that they grow vigorously and attain good size within weeks. The parents want that the chicks should leave the nest as early as possible. They also train the chicks to fly and also take care of them against the predators.

MIGRATION is part and parcel of birds' life cycle. Tens of thousands of birds migrate twice a year in search of better avenues of food, shelter and reproduction. They undertake long journeys, across oceans and continents, braving numerous hazards. Yet these migrations to and from far off localities are amazingly regular and predictable as regards the timings. The birds return precisely to the same area in both their summer and winter homes, which are separated by as much as several thousand miles. Some species migrate for their survival, while others take it as routine exercise. Birds migrate from a harsh climate in winter to a warmer one and return to their homeland in summer, at a time when trees and plants are blooming with leaves and flowers and there are plenty of worms and insects on which they feed themselves and their family.

Besides the trans-migration some birds migrate locally. These simple and short migrations are made for breeding purposes. In hills doves migrate from sub-Himalayan region to river valleys and bhabar zone during winter and go back to higher hills with the commencement of summer for breeding purposes,

For trans-migration birds make long preparations before the actual take off. They eat voraciously and put on extra fat which sustains them during the long journey. The rising and setting sun gives them cue for departure. The sun, moon and stars give them direction and guidance. Birds fly at a height of 500 to 1500 metres both in large and small flocks. They generally fly in day time, but some small birds fly by night for safety purposes. Smaller

birds fly with a speed of 30 kilometre per hour, whereas bigger ones fly at 80 kph. Across the land birds fly for nearly 8 hours a day and cover a distance of 250 to 500 kms in one flight. But while flying across the sea they have to take forced flights for as many as 36 hours non-stop. This non-stop flights sometimes result in heavy casualties. Of the 1200 species of birds found in India about one fourth, comprising cranes, ducks etc. come from distant land in winter covering a distance of 5000 kilometres.

The world of birds is unique and full of mysteries. Much of this has been unravelled and much more is yet to be explored. Ornithologists and biologists world over are busy in studying the bird fauna and documenting it, but the information collected by amateur bird watchers may prove to be of great value, which will go a long way in compiling life history of many bird species. Bird watching should, therefore, be given every encouragement and should be developed as a sport.

GOLDEN OR LIGHT BROWN CROW

by

Bulu Imam

On Sunday, the 8th November, 1987, my wife and I had been in the garden of our compound not very far distant from the jungles of the Canary Hill, a prominent local feature. We were busy collecting custard apples when I noticed a few crows perched on a nearby Golmohur (*Delonix regia*) tree. The birds had been disturbed by the two boys whom we had sent up the custard apple trees. These birds had been busily drinking the date palm toddy being collected in clay pots put on these Khejur (*Phoenix sylvestris*) trees.

All of a sudden, high up in the upper branches of the Golmohur tree a brownish gold bird alighted with a flashing of its wings. Attracting my attention, I found that it was also a crow but of a golden colour. Its wings extended, flashing pure gold in the feathers of the outer secondaries and greater wing coverts. Indeed, it was unbelievable, since I had only once before heard of albinism in the crow and this was about the pre-twenties when such a sighting of a partly white crow had been made behind a judge's house in Lee Road, Calcutta recorded in one of the early volumes of the Bombay Natural History journal. The bird in front of me was the tertiary albinism exemplified in the jungle crow (*Corvus macrorhynchos macrorhynchos*), which birds inhabit our wild compound with its vast grounds with huge trees.

On the other branches of the tree sat the rather sober, smooth backed house crows (*Corvus splendens*) with their ash-grey necks cocked looking at their unusual companion. The birds were a bit drugged owing to the intoxicating influence of the toddy palm juice! The golden bird seemed the only alert one. The other birds noting its arrival kept aloof, as the brown bird jumped gaily from branch to branch. In its flight the birds struck me as being heavier above the back and scapulars region. Also, the nape of the neck was fuller, with a thick plumage behind the head, typical of the jungle crow. The bird sat unselfconsciously apart from the others with a distance of about twenty feet separating them, a respectable distance. The bird was one of the company, but apart. The striking thing about it was its alertness and full of life, the head held rather more forward with its weight well ahead of its leg as if about to caw or fly. For an instant it resembled the crow pheasant or Mhowcal which is also common amongst our trees.

Of a sudden it flew with off the tree alone with deep full strokes of its wide and flashing wings which shone like gold in the morning sun. The upper parts of the back and

wings were heavily rounded in its flight and the form reminded me of a seagull. The upper face of the outer secondaries caught the sun and glinted with a very bright, burnished golden hue in the sharp sunbeams. After flying about a hundred and fifty yards, keeping high in the air all the time, it entered a small wood of tall teak (*Tectona grandis*) trees and temporarily disappeared from our view. By now I had decided that it was a specimen worth collecting, so collected my telescoped, .22 Remington rifle and went after it as a collector. On approaching these trees I noticed a movement in the upper branches and discerned the light coloured form. It was then on a high branch of the tree again leaning out well forward, rather obviously well forward of its feet on the branch, with its head held rather low as crows do when cawing and for an instant I thought that it was about to either caw or take flight, neither of which it did. It maintained this top-heavy position as I brought up the rifle slowly and rested it on the side of the Neem (*Azadirachta indica*) behind which I was leaning at the time. In the telescope I could see it very clearly. Its head was held low and stretched out, unlike the alert and upright position of an ordinary raven. There was another normal black house crow about twenty feet away from it in the branches. Taking aim I reluctantly fired and the golden bird instantly fell off the branch falling dead to the carpet of thick brown leaves below, noiselessly. The distance between us was about sixtyfive paces. It had been aware of my approach and intention but had not acted in the suspicious way crows generally do, and so unlike an ordinary crow it gave me the lethal opportunity to bag it. I attribute this lack of wariness to unfamiliarity with man. After the bird fell to my shot the other crow in the tree which may or may not have followed it to this tree, flew off without any demonstration such as one would have been expected if a normal companion had been killed, as is the habit of crows. From this it would seem that the other crows were not closely associated with this bird. The golden crow had uttered no cry or any other sound which I may describe. At that time now six years ago my estate had not many jungle crows as it now has. As I have wilderness to overtake my grounds so the ordinary house crows have migrated off into the neighbouring town, being replaced almost wholly by the big jungle crows which are common to such wild environment.

Upon examination the bird naturally proved to be a crow of the heavy jungle variety I have described. It was a uniform brownish gold in colour all over, the upper wings, back, rump, upper tail coverts, and upper retrices all being a light brownish gold. The head, nape and breast were all a slightly duller shade. The undersides from breast to abdomen were uniformly a dirty coffee colour. The throat hackles were lighter on the inner side and darker towards the tips. The eyes were a darkish grey in death (as if the light had gone out of them) and in life I expect they had been a shining steel grey. The cutting beak was rather lighter and narrower than the ordinary raven. The legs too were thinner and finer in build, and the overall body size although that of the ordinary bird was having a decidedly "fluffed out" plumage rather than a sleek appearance. It was a bright golden bird on the upper parts of its body with a coffee coloured drabness on its undersides. There was no trace of

black or grey anywhere in the feathers. Upon dissection the meat was clean and possessed absolutely no unpleasant odour. Fortunately the light bullet had entered at the junction of the right leg with the body and broken out through the left humerus. The skin was carefully removed and salted with a view to preservation and taxidermy. Several photographs were taken in colour before, during and after dissection.

In the Bombay Natural History Journal Vol. VII, No. 2, in an entry dated 20th September 1906 at page 519 there is a note that states a specimen of *Corvus splendens*, the ordinary house crow, resided in the compound of Mr. Justice Woodruffe in Russell Street, Calcutta, and was a light brown colour throughout except for its ashy coloured neck, its wings shining bronze in the sunlight. This crow it is reported was persecuted by the other crows in the area.

I sent our specimen to Mr. Humayun Abdulali of the Bombay Natural History Society, and upon studying it this eminent authority felt that the specimen was a jungle crow, and the following measurements are given by the Society : Wings—295, Bill 60.7, Tar 44, Tail 155—all measurements in millimetres). The bird was placed in the Bombay Natural History Society museum collection. Mr. Abdulali informed me the Society's collection has a crow that is pure white, or an example of complete albinism. Tertiary albinism in crows shows up in brown, and our specimen is so far the only one preserved in India of this condition. It may be of interest to note that a brown and white specimen of crow was shot by the Rev. L. Kraig, s.j. in Versova, Bombay very long back. Further, it will interest readers that about a month back (May, 1993) a brown crow was again sighted in our trees by my wife and son, but I failed to see it.

It is of great interest that we have recently had a sighting of the golden crow or light brown coloured crow which describes this manifestation of tertiary albinism in the great black, thick necked croaking jungle crow, *Corvus macrorhynchos*.

This note is being published for bird watchers and bird lovers everywhere and we would be delighted to answer any further queries to bird fans.

PIPERWAR DOUBLE LOOP RAILWAY—AN ENVIRONMENTAL HAZARD, BEING CONSTRUCTED BY CENTRAL COALFIELDS LIMITED THROUGH MS IRCON, RANCHI IN THE NORTH KARANPURA AREA

By

Bulu Imam*

The railway under description is 32 kilometres in length, coming from Mc Cluskiegunj and going to the Piperwar Beneficience Plant for handling coal. One wagon rake is expected to traverse the line in 60 minutes, and loading of one rake in the modern handling is estimated to take one minute. Further, 120 kilometres of such railway is in planning. The first points which are to be coasidered are that :—

1. The first mine, Piperwar, with Australian funding and technology, has reached peak performance at 6.5 million tonnes yearly. The second mine, Ashoka East, and third mine Ashoka West, are in operation. Earlier, one mine, Mangardaha, has already been completed. There are 25 mine blocks which have been now subdivided into 2 to 4 individual mines, so the North Karanpura Coalfields Project will have over 50 mines, displacing over two hundred tribal villages, and destroying age old sal forests and wildlife corridors of elephant, tiger, leopard, gaur, bear, deer, etc.

2. Recently a ground survey was conducted by Governing body of World Wide Fund For Nature (Bihar chapter) in which it was established in Satpahar Range alone that some nineteen wild elephants from Palamau, in groups, had been held up by the mining operations and ancilliary developments. Evidence of tiger, leopard, bear, deer, etc. was also found.

3. The new railway line from Mc Cluskiegunj has cut through 20 kilometres, mostly forests. Thousands of old sal, mahua and other jungle trees have been hacked down at places upto a *width of two hundred metres*. How has such destruction been possible? The jungles are on Gair Mazurwa lands which do not come under the Forest Department, and are in possession of the tribals. Since most of the tribals do not possess land title papers the compensation is made direct to the State government. Further, no compensation is msde for the trees destroyed nor is any compensatory afforestation done. Thus the forest corridors between Palamau and Ranchi have been destroyed at some places and the planned destruction is about to begin from Pinderkom (existing) to Magadh and Amrapalli (planned) mine blocks.

4. No mandatory impact study on migratory corridors was done in the environment impact assessment (EIA) nor in the environment management plan (EMP).

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5. Overburden from the railway cuts are being dumped on rare archaeological and palaeoarchaeological sites, and in rice fields. Blasting from the railway line under construction is affecting seven thousand year old rockart in the adjacent Satpahar hill ranges at seven sites.

6. In 1993 INTACH formally petitioned the UNESCO through the Indian National Commission to consider the area an endangered World Heritage Site, placing over four dozen sites from palaeolithic, mesolithic and neolithic, through iron age to Buddhist-Mauryan period down to more recent times. Major megalithic sites and remains of vihara, as well as mesolithic rockart sites were identified. This appeal has been held up.

7. Since 1993 the Centre for Interdisciplinary Studies of Mountain and Hill Environments (CISMHE) at Delhi University has been preparing a multidisciplinary study, which bore out Philip Carter's study that the region contained one of the last important remaining habitats for the Indian tiger, and elephants.

In view of the foregoing points the World Bank decided to send a competent expert wildlife team to survey the areas in question. This team will include, among others, Dr. Eric Wikramanayake, Senior Fellow, Conservation Science Programme at WWF-US, who was the principal author of "A framework for identifying high priority areas and actions for the conservation of tigers in the wild", published last year (1997). This work identified Bagdara - Hazaribagh as a Level 1 Tiger Conservation Unit (TCU). A Level TCU is defined as *"offering the highest probability of persistence of tiger populations over the long term. They are essential for a global tiger conservation strategy. Level 1 TCU share the following attributes large blocks of habitat suitable for tiger and prey, with adequate core areas, low to moderate poaching pressure on tigers and prey species, either as a result of remoteness or vigilant protection."*

The matter was referred by me to the Chairman of the Cat Specialist Group of the IUCN's World Conservation Union, Mr. Peter Jackson a well known friend of the tiger, who ran news in CAT NEWS, 1996 and subsequently helped in getting the attention of Dr. Sukumar, Chairman of IUCN's Asian Elephant Specialist Group. It is proposed to bring these matters before the 6th World Wilderness Congress at Bangalore in October this year. Mr. Peter Bosshard, Director, Berne Declaration (Zurich) also formally has taken up the matter of the railway construction and its threat to wildlife and enforced displacement of tribals, with the Central Coalfields Limited (Ranchi) and its railway contractors IRCON (Ranchi). The Berne Declaration is a Swiss public-interest organization with 16,000 individual members since 1968, in the fields of North-South relations, human rights, and protection of the global environment, has raised the issue with Coal India Ltd. Apart from damage to the wildlife corridors, it is important to see how the tribals are being affected by the mines and railway. Although the present railway is 32 kilometres in length; 120 kilometres of railway is in the planning around the entire North Karanpura

Valley from Tori Jn to Patratu Jn. If 203 villages are being destroyed by the mines an almost equal damage to life and property both human and animal, is envisaged through the construction of the proposed railway. The latest Australian in-pit crushing and mechanized delivery from pit to mine-head Beneficence Plant (i.e. washery) and railhead, is the design. Rate of work is faster, rate of employments reduced drastically. The tribals who have title to 3 acres of land may get a job with Central Coalfields Limited, and a matriculate with 2 acres of of land having title. Very few jobs are given. All along, dozens of tribal hamlets being razed by the mines and railway are three important adjuncts of tribal life, the *Sasan* (Pathalgara) or burial-ground, usually an ancient prehistoric megalith site; *sarna* or sacred grove, having age old sal (*Shorea robusta*) trees; and *akhara* or dance and council grounds. The art painted by the tribals in the Khovar (marriage) ritual or Sohrai (harvest) rituals, are echoes of the prehistoric rockart in the ranges overhanging these villages dating from the mesolithic (7000 Before Present) to neolithic (4000 Before Present). Indeed we are here witnessing nothing less than ethnocide. The archaeological record proves the indigenou-ness of these tribals and their rights to instruments such as the United Nation's (draft) Declaration on the Rights of Indigenous Populations. India does not accept that it has any indigenous populations in the UN forum. Forced evictions are illegal. In nearby Netarhat a Field Firing Range threatened 235,000 tribals belonging to Oraon, Munda, Nagesia, Kisan, Birjia, Asur, Birhor and Korwa tribal groups. Many other tribal groups will be affected by the North Karanpura projects including Bhagat, Ganju, Kurmi, and various Scheduled Castes. CCL has been able to put forth no form of public justification for hundreds of families forcibly displaced in the Piperwar Project who received nothing and hove nowhere to go. Human rights are non-commodified goods which are bestowed on human beings irrespective of legal title. Each one of us is in possession of much to which we can show no legal title. What if these goods were forcibly snatched from us? Would it not be a criminal act? What of the hundreds of families which have lost their homes due to the new railway line from Mc Cluskiegunj to Piperwar washery?

I will place the tribals in their context of wildlife corridors in the range of the tiger as outside the concept of wilderness ecosystems as understood in North America (e.g. Yellowstone NP), and rather inhabited forest areas with marginal subsistence farming where the deer and the tiger wander, and the wild Asian elephant moves at will through crops. Such ecosystems of "inhabited forests" are found from Assam to South India. In areas where population and subsistence agriculture have taken a higher toll of once forested lands the ecological harmony has accordingly adjusted itself. In many an area which may not be termed a HABITAT of tiger, elephant or gaur (Indian Bison) shall we find the ways by which nocturnal passage may be freely made by these great animals. Not only them, but also by deer and boar, the food of the tiger, the foolish bear and clever hyaena, the whole food chain so to speak. Scenes are depicted in the prehistoric rock art of the region showing the animals in slow procession in the recesses of a sandstones shelter.

In recent studies commensalism, which is the relationship in which animals can live in close association with man, especially to derive some benefit, neither harming nor being parasitic on the other (Stephen Budiansky, *Covenant of the Wild*, Weidenfeld and Nicholson, London 1994). E.O. Wilson the Harvard biologist had postulated some years back in similar vein that connected habitats would produce greater biodiversity than severed ones. Nature has kept her biological harmony in places such as the North Karanpura valley, where the tribal cultures are residing in the fold of forested hill and scrubland vale, with great food trees such as mohua (*Madhuca latifolia*) which bears abundantly the hundreds of edible plants which both deer, and elephant need especially in their long range, and other food crops grown by the villagers. The forests are pristine and in their topsoil are the hardy minute plants which constitute the jungle-floor ethnobotany of the Birhor hunter-gatherers. Mining and the merciless cuts of the new railway fifty feet and more in depth, crushing under fifty feet overburden dumps to a width of hundreds of yards, will forever bury these priceless resources of 'the skin of the Mother Earth'.

The destruction of sparsely forested or even barren-ground, of rice field and tanrs on which mustard and legumes grow in winter, must be seen in their proper place as part of an ecosystem used jointly for food and passage of both the Indian villager, the pachyderms and wild bovines, the great cats of the jungle, the graceful deer, the bear, boar, hyaena and ubiquitous jackal. In the mine environment assessment Piperwar was said to only possess rabbits (hare) and foxes !

Of course the wildlife corridors of North Karanpura will have to be seen in the overall larger context which Philip Carter presented in his study published in *SANCTUARY* Sanctuary ASIA vol. xvii, No. 5, October, 1997), and *The Ecologist* (vol. 6, No. 2 March-April, 1998), and *CSE CHANGE* (Sept. 15, 1997). Carter's hypothesis was very simple : the North Karanpura area where these fifty odd mines are proposed is a corridor between the eastern and western range of the tiger in Central India, between Baghelkhand and Hazaribagh. The watersheds of the Damodar, Bokaro, Konar, Barakar and Mohania rivers, and the mighty hill ranges of Satpahar and Mahudi, Konar and Hazaribagh, in the shadow of which still lie the largest undisturbed tiger habitat in eastern India, *could be isolated*, killing the range of the tiger. As Carter's study showed, a further minefield was proposed through Madhya Pradesh, eastern Maharashtra and Orissa. He spoke to Raghu Chindawat of the Wildlife Institute of India at Dehra Dun and came away with the understanding that present statistics can only indicate the presence or absence of tigers in given areas, such as parks. The population of tigers for Bihar, Madhya Pradesh, Orissa and Maharashtra was placed at 1,551 in an area covering 170,000 sq. km. This would represent a third of the remaining wild population of the tiger in the world. *Tiger populations in corridors, outside parks, is not known*. The 25 mines in North Karanpura are part of a larger network of 495 opencast coal mines planned through the four states mentioned. World Bank funding in these mines brings the Bank directly into the picture. Thus it was that after Carter's study

was published and put on the Internet (<http://www.5tigers.org/>), the Bank commissioned Dr. Wikramanaike's study, about to take place. Philip Carter's study, *Hazaribagh; Land of a Thousand Tigers* may be found on the Internet at <http://www.5tigers.org/world-bank.htm> at the International Tiger Centre's Website. Carter is separately maintaining the *Thousand Tigers Website* at <http://www.web.net/~pcarter/hazaribagh>, from Osaka, Japan. This report will be found on it soon.

The issue of the railway being built and its destruction of wildlife corridors and abuse of human rights has recently been taken up in Australia.

ARTSWEST, the broadest and most representative Arts organization in the Western Sydney region has written to Horible Alexander Downer Minister for Foreign Affairs, Trade and Defence, with regard to forced displacement of tribals, damage to prehistoric art and archaeology, and destruction of wildlife corridors. Appeals have been made by several Australian Members of Parliament, including Senator Marise Payne. Frank Mossfield MP, Federal Member for Greenway. Laurie Ferguson, MP, Federal Member for Reid, Etc. Artswest has drawn support of ten other MPs and Hon. Philip Ruddock, Minister for Immigration. Mr. Downer's office has asked the Australian High Commission in New Delhi for further details (10 July 1998). Thus it is to be seen that the destruction of the wildlife corridors in North Karanpura area, and the violation of human rights has drawn international attention. MIDTECH TV are now coming to film a feature directly relating to the implications of the Piperwar Project Loop Railway on wildlife corridors and Tlibal hamlets as two separate issues. The film is planned to start filming in August. Edward Goldsmith has asked me to write an article on how valuable the wildlife corridors are and how they are being destroyed by the mining companies with the backing of the government, the World Bank, and so called experts.

It seems the time has come for a proper consideration of the idea of what constitutes a wildlife corridor in South Asia, what should be the guidelines for foreign investment ethics for foreign companies working in India and looking at the weaknesses inherent in the environmental impact assessments done by the Ministry of Environment and Forests. For one, the destruction of wildlife corridors in regard to tigers, without even a nominal survey of tigers in the area, as in the case of Hazaribagh and the North Karanpura Coalfields Project, is patently preposterous. The same would apply to impact on the Asian Elephant in this sensitive area.

STATUS SURVEY OF WILDBOAR (*Sus scrofa*) IN THE GAJNER WILDLIFE SANCTUARY, BIKANER

By

Yogender Singh and P.R. Ojha*

Introduction

The wildboar (*Sus scrofa*) is one of the most widely distributed non-ruminant ungulate in peninsular India. It lives wherever it finds shelter and food. It lives readily in the plains as well as in mountains at elevations upto 4000 m in swamps, in dry steppes, in remote as well as in densely populated areas.

The population and distribution of wildboar has been studied in India by Bedi and Bedi (1984), and in Pakistan by Inyatulah (1973) and Mirza (1978). The wildboar has been declared as an agricultural pest and losses caused by it have been estimated by Krishnan (1972), Mirza (1978), Shafi and Khokhar (1986) and Ramachandran et al. (1986).

The detailed studies of the habit, habitat, food, feeding, social behaviour, population dynamics are yet to be carried out on this animal. Present study is an effort in this direction in which status of wildboar has been studied in the Gajner Wildlife Sanctuary, Bikaner located in the Indian desert.

Material and Methods

Description of study site

The Gajner wildlife sanctuary is located at latitude 27°57'N, longitude 73°03'E and altitude 233 m MSL. It is situated about 25 km southwest of Bikaner in the Indian desert area of Rajasthan (India). The total area of the sanctuary is 38 sq. km. In the sanctuary one perennial artificial lake namely Gaj Sagar, one dam, the Naya bandha and tow big ponds namely the Sujan Sagar and Chunda Sagar serve as the water support. The catchment area of the sanctuary is connected with small water courses and canals namely Toofan Canal and Golri rivulet draining total water into the lake and the ponds. At the eastern bank of the lake, a big palace is situated and the other three sides of the lake are covered with thick bushes and big trees of good foliage.

Methods

Out of the major wildlife fauna described earlier, wildboar (*Sus scrofa*) was selected for the study of its population structure. The sanctuary was surveyed, the hand sketch

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maps were prepared and the boars were followed, counted and marked on the maps. The results were also analysed on the basis of age and sex composition.

The detailed ecology of the sanctuary has been studied by Ojha et al. (1992), which represents the typical dry desert conditions and desert adapted flora and fauna.

Result and Discussion

The wildboars were surveyed and repeatedly counted group-wise and their age and sex ratio were noted (Table 1).

(i) Total population :

The Gajner sanctuary harbours a total of 67 wildboars divided in eight groups (Table 1).

(ii) Group size

The group size of wildboars ranges from 5.6 to 11.6, averaging 8.18 animals.

(iii) Adult male—Adult female sex ratio

The total population shows the adult male adult female sex ratio as 1 : 1.30.

(iv) Adult-immature ratio

It is found that the adult—immature ratio is 1 : 1.9 i.e., the adults are 34% of the total population and the immature are 66% of the total populations.

(v) Age and sex composition

The age and sex composition of the Gajner wildboars population comes to an average as adult male 1.17; adult female 1.53; sub adult male 1.28; sub adult female 1.79; and infants 2.20. Thus the age and sex composition percentage wise comes to 14.74% adult male; 19.23% adult female; 16.02% sub adult male, 22.43% sub adult female and 27.56% infants.

(vi) Population Density

The population density of wildboars in Gajner sanctuary (38 sq. km) comes to about 1.76 boars per sq km.

(vii) Population Trend

The estimated low standard deviation indicates consistency in total population of wildboar at Gajner, as recorded for five groups.

Discussion

The wildboar is distributed almost throughout India and its population recorded from various National Parks, Sanctuaries, Protected areas is quite in good number e.g. 5,200 at Corbett National Park; 4,654 at Kanha National Park; 700 at Kaziranga National Park; 800 at Bandipur wildlife sanctuary; 300 at Keibul Lamjao National Park, Manipur. (Bedi and Bedi, 1984) and 2200 at Project Tiger, Ramnagar, Uttar Pradesh (Negi, 1991); Similarly in Rajasthan wildboar are recorded, 6,263 at Project Tiger Sariska, Alwar, 2,278 at Ranthambhore wildlife sanctuary (Bohra, 1991); 187 at Gajner sanctuary. The wild boar has also been noted at various other places in India but the census records are lacking. The age and sex composition of the wildboar is available only from wildlife sanctuary, Ranthambore (Bohra, 1991) and Gajner (Forest office record, 1991). The adult male female sex ratio at Ranthambhore is 1 : 1.9 and at Gajner 1 : 0.6 in May 1989. The age and sex composition at Ranthambhore is described as adult male 25%, adult female 47.4% and the infants 27.52%. The age and sex composition at Gajner sanctuary (Forest office record, 1991) is reported as adult males 39.70%, adult females 26.74% and infants 33.82%. The adult immature ratio at Ranthambhore is given as 1 : 0.38. The adult immature ratio mentioned by forest office record at Gajner sanctuary is 1 : 0.51.

The year-wise total population records are only available from four places i.e. Gajner, Ranthambhore, Ramnagar and Sariska. The total population shows variation over the period (Table 2). The age and sex composition and adult male female sex ratio as well as the adult immature ratio and standard deviation of the population investigated shows a trend of the stable and increasing tendency of the wildboar population at Gajner. The trend equations of the population for the different sanctuaries and Project tiger were also worked out as below :

$$Y = a + bt$$

Where "Y" is the population of the wildboar and "t" is time. In the equation "a" and "b" are the intercept and trend (regression) coefficients respectively.

The estimated trend equation (Table 2) indicates that the intercept is large for the Sariska wildlife sanctuary (Y_A). It means the population of the wildboar is large and thus the trend coefficient " Y_A " is negative, which reflects a decreasing trend or the decreasing population in Sariska wildlife sanctuary. The trend coefficient reveals an increasing trend in the Ranthambhore Project Tiger (Y_s) and Project Tiger, Ramnagar (Y_N). No such trend could be calculated in the present study because of lesser number of observations.

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Table 1

Age and Sex composition of wildboar (*Sus scrofa*) in Gajner wildlife sanctuary, Bikaner (November, 90 to April, 91)

	AO	AO	SAO	SAO	JO	JO	1	Total	Average of ground size
	↑	+	↑	+	↑	+			
Average*	1.17	1.53	1.28	1.79	—	—	2 20	8	8.18
Percentage	14.74	19.23	16.02	22.43	—	—	27.56	99.98=100	—

Adult male and Adult female sex ratio—1:1.30

Adult and Immature ratio —1:1.94

*Based on the study of eight groups

A=Adult, S=Subadult, J=Juvenile, I=infants

Table 2

Yearly total population of wildboar studied by various workers at Ranthambhore, Sariska, Ramnagar and Gajner

S. No.	Wildlife sanctuary National Park/Reserve	1985	1986	1987	1988	1989	1990	1991	Trend Equation $Y=a+bt$
1.	Ranthambhore Project Tiger (Swaimadhopur)	403	342	350	418	466	410	—	$Y_s = 398.17 + 13.57t$
2.	Sariska Wildlife sanctuary (Alwar)	4532	5778	6263	4995	2061	—	—	$Y_A = 4765.8 - 582.5t$
3.	Project Tiger, Ramnagar (Nanital)	—	1426	1907	1650	2095	2200	—	$Y_N = 18.55.6 + 173.6t$
4.	Gajner Sanctuary (Bikaner)	—	—	—	—	68	187	117	N.E. ¹

1. Only three observations, therefore not estimated.

Census source : Official record of sanctuaries and project tiger.

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CHECKLIST OF BUTTERFLY FAUNA OF KEOLADEO NATIONAL PARK, BHARATPUR (RAJASTHAN)

By

M.M. Trigunayat* & N.P. Singh

Keoladeo National Park, is known for its avian mega diversity. A small area of 29 Sq. km. consists of as much as 372 species of plants (Prasad *et al* 1996), 369 species of birds (Anonymous, 1996, WWF-Checklist); 50 species of fishes, 5 species of amphibians, 8 species of lizards, 13 species of snakes, 7 species of turtles and 27 species of mammals (Vijayan, 1987). But no such reports, on insects in general and butterflies in particular, are available. Scanty reports, however, are available (Trigunayat, 1997). Residues of several pesticides have been reported from the waters of Azan dam which supply water to the park, (Vijayan, 1990). Pesticides are known to cause serious ecological implications resulting into potential threats for the survival of local fauna. Local inventories are, therefore, of much importance for documenting the available informations to adopt suitable conservation strategies. The present checklist is second in this series (first being the checklist of Jaipur region, Trigunayat and Singh, 1997). Since the park is a world heritage site and has checklists available on vsrtebrate fauna, therefore, in the present study, an attempt to prepare an inventory of butterflies was made. Such local inventories play a vital role in assesment and monitoring of species to adopt suitable conservation strategies.

Exhaustive and more comprehensive results shall be communicated in future. The present study, revealed (Table 1). a total of 35 species belonging to 19 genera of 7 families. Pieridae was the most commonly occured family followed by Nymphalidae and Lycaenidae. Danaidae and Papilionidae, however, exhibited moderate presence. Identification was done using Evans (1932) Wynterblyth (1957) Talbot (1939) publications. Revised nomenclature for the taxa (Varshney, 1980, 1985) was also consulted.

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Table 1
Checklist of Butterflies of Keoladeo National Park

S. No.	Family	Genus	Species	Common Name
1.	DANAIDAE	DANAUS	<i>Danaus plexippus</i> (Linn) (<i>Danaus genutia</i> (Kramer)) <i>Danaus chrysippus</i> (Linn) <i>Danaus limniace</i> Cramer (<i>Danaus limniace leopardus</i> (Butler))	Common tiger Plain tiger Blue Tiger
		EUPLOEA	<i>Euploea core</i> Cramer <i>Melanitis leda</i> (Drury)	Common Indian crow Common evening brown
2.	SATYRIDAE	MELANITIS	(<i>Melanitis leda ismene</i> (Cramer))	
3.	NYMPHALIDAE	HYPOLIMNIAS	<i>Hypolimnias misippus</i> (Linn) <i>Hypolimnias bolina</i> (Linn)	Danaid eggfly The great eggfly
		EUTHALIA	<i>Euthalia garuda</i>	Baron
		PRECIS	<i>Precis almana</i> (Linn) <i>Precis hierta</i> Fabr. <i>Precis lemonias</i> (Linn) <i>Precis orithyia</i> (Linn)	Peacock pansy Yellow pansy Lemmon pansy Blue pansy
		ATELLA	<i>Atella phalantha</i> (Drury)	Common leopard
4.	PAPILIONIDAE	PAPILIO	<i>Papilio polytes</i> (Linn) (<i>Papilio polytes romulus</i> Cramer) <i>Papilio machaon</i> (Linn) <i>Papilio demolus demoleus</i> (Linn)	The Common mormon The Common yellow swallow tail The Lime butterfly
		POLYDORUS	<i>Polydorus hector</i> (Linn)	The Crimson rose
		(ATROPHAN-EURA	(<i>Atrophaneura hector</i>) <i>Atrophaneura aristolochiae</i> <i>Pieris brassicae</i> (Linn)	The Common rose The Large cabbage white

S. No.	Family	Genus	Species	Common Name
5.	PIERIDAE	PIERIS	(<i>Pieris brassicae nepalensis</i>) Doubleday	
		COLOTIS	<i>Colotis etrida</i> (Boisduval)	The Little orange tip
			<i>Colotis eucharis</i> (Fabr)	The Plain orange tip
			<i>Coloris vestalis</i> (Butler)	The White arab
			<i>Colias croceus</i> (Fourcroy)	
		COLIAS	(<i>Colias electro fieldi</i>)	Dark clouded yellow
		IXIAS	<i>Ixias marianne</i> (Cramer)	The White orange tip
			<i>Ixias pyrene</i> (Linnaeus)	The Yellow orange tip
		CATOPSILIA	<i>Catopsilia crocale</i> (Cramer)	The Common emmigrant
			<i>Catopsilia crocale pomana</i> (Fabr)	The Lemmon emmigrant
			<i>Catopsilia pyrenthe</i> (Linn)	The Mottled emmigrant
		TERIAS (EUREMA)	<i>Terias libythea</i> (Fabr)	Small Grass Yellow
			(<i>Eurema brigitta rubella</i> (Wallace))	
			<i>Terias hecabe</i>	The Common grass yellow
			(<i>Eurema hecabe</i>)	
6.	LYCAENIDAE	AZANUS	<i>Azanus ubaldus</i> (Cramer)	The Bright babul blue
		EUCHRYSOPS	<i>Euchrysops pandava</i>	The Plains cupid
			Horsefield	
			(<i>Euchrysops parrhianus</i> <i>minuta</i> Evans)	
		ZIZEERIA	<i>Zizeeria gaika</i>	The Tiny grass blue
			(<i>Zizula gaika</i> (Trimen)	
			<i>Zizeeria otis</i>	The Lesser grass blue
7.	HESPERIDAE	BAORIS	<i>Baoris guttatus</i> (Bremer and Grey)	
		(PARNARA)	(<i>Parnara naso bada</i> (Moore))	Straight swift

Revised names are given in brackets.

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CONGRESS GRASS & RAJAJI NATIONAL PARK

By

Dr. S. Farooq

During one of my visits to the Rajaji National Park I came across with the disastrous role of Congress grass (*Parthenium hysterophorus*) to the flora and fauna which seemed to be bone chilling. The ravaging onslaught to the green pastures and even to the rare species of herbs is really a cause for concern and needs to contain this menace.

The interest in preserving our environment and herbs is definitely going to be promising. It is with this view I thought it worthwhile to focus attention in this article of all concerned to wipe out the Congress grass—the deadly weed—with bell book and candle.

Congress grass, which has assumed the status of a major health hazard in India, is one of the seven most dangerous weeds of the world. This weed which is a native of U.S.A. and Mexico is reported to have been first brought to India in 1910 as an ornamental plant, but it failed to catch up. In wild form it was first noticed by Paranjape in 1951 and was first reported by Rao in 1956 from Pune.

It seems the plant got its entry this time in seed form as a contaminant of wheat received from Mexico imported under PL-480 scheme. Since then the weed has not only naturalized itself; but has spread at an alarming rate and has been reported from almost all over India.

Asthma, allergy causing itching etc. have been reported due to this weed. It has been found that weed contains certain water-soluble lactones and flavanoids which are responsible for its harmful effects on human beings, animals and other plants.

This weed which is commonly known as carrot weed "Gajjar Ghas" seriously influences the growth of other plants. Certain allelochemicals leach out from this plant into the soil which inhibit the growth of other plants and results in the predominance of this harmful weed.

None of the available methods of control, viz.; mechanical, chemical and cultural offer complete solution for its eradication due to various factors. In addition to it, *Parthenium* weed has remarkable power of regeneration as the stumps left after cutting the plant, sprout back producing a large number of shoots from latent crown buds and flowers are produced in such shoots within thirty days. Even the process of cutting and burning adopted by Horticulture department of Chandigarh administration to overcome 'parthenium' problem met with little success.

Since common manual methods of management seem to be of little use in eradication of this weed, biocontrol measures acquire great significance. The biocontrol tactics, which utilizes natural enemies of the weed, seem to be most advantageous as it provides a low cost, continuously working force for containment of this weed. A weed can be effectively controlled at two stages of its life cycle

1. At the pre-seedling stage by inhibiting the germination of seeds.
2. At the seed formulation stage by suppressing the seed formulation.

For weeds, which exclusively propagate by seeds, the control will be much more effective if the seeds are not allowed to germinate. With this aspect of biocontrol in mind Dhawan et al. (1993) and Loganathan et al. studied allelopathic effects of *Veronica leschatei* obtained from acid parts of different plants on germination of *Parthenium* seeds. While Dhawan and Dhawan (1993) reported maximum inhibition of seed germination in leachates of *Prosopis spicigera* (91.18%), *Prosopis juliflora* (85.30%), *Casipium annuum* (65.34%), *Cajanus cajan* (62.67%) and *Ficus religiosa* (41.34%). Loganathan et al. (1994) using 10% leechates reported 100% inhibition by *Abutilon indicum*, *Cassia occidentale*, *Tephrosia purpurea*, *Cajanus cajan* and *Prosopis juliflora*. Dhawan and Dhawan (1995) as a result of their studies reported that plants like *Cajanus cajan*, *Albizia lebeck* and *Cassia fistula* can be favorably used in biocontrol of 'Congress grass' without any adverse effect on environment. However more efforts to meet the menace of Congress grass are needed.

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ANIMAL-PLANT INTERRELATIONSHIP IN THAR DESERT

G.R. Parihar* and S.M. Mohnot

Introduction

The Great Indian Desert extends over 1.3 million km² (India—Pakistan) which is half of the Arabian desert (i.e. 2.6 million km²) and 1/7th of the Saharan desert (i.e. 9.1 million km²). In India, it extends over 285,680 km² (Rajasthan 196,150, Gujarat 62,180, Punjab and Haryana 27,350 km²) and is situated between Longitude 68°05' to 75°45'E and from Latitude 22°30' to 32°05'N.

Earlier relevant work was done and supported by the observation of Advani and Jain (1982) on burrows, Agarwal et al. (1976) on the proficiency of native plant species and *P. cineraria*'s support to grasses under it (Ahuja, 1980). A somewhat similar work has been done by Akhtar and Lalonde (1994), on this kind of relationship between plants and animals.

Material and Methods

Like specific studies carried out randomly in the village Institution using transect method, animal-plant interrelationship was investigated to ascertain the peruse biodiversity profile in Rasala and Kanasar villages.

For this purpose, out of large number of trees which are found in these villages, most dominant tree species were selected. Three of them were endemic and one was exotic species. They are *Prosopis cineraria*, *Capparis decidua*, *Zizyphus numalaria* and *P. juliflora*. Thirty trees of each species were randomly observed during March-April for 20 minutes at one time covering about 75 sq. m of area in and around each tree with a purpose to understand association of different animals with these plant species.

Animals found with each plant species in about 10 hours' of observations were recorded. To establish animal-plant association nests in the trees and burrows on the ground were also studied and counted.

Study Area and Location

The villages Kanasar in Barmer and Rasala in Jaisalmer were selected for biodiversity studies. Villages Kanasar and Rasala are located 45 and 62 kms respectively from the Desert National Park, Jaisalmer which is in the process of receiving the status of a Desert Biosphere by the Central Government.

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Observations and Results

The random observations in Rasala village suggest that *P. cineraria* is most liked by animals, where 2 mammalian species, 12 birds species and a reptile was observed. *Z. nummularia* support 11 species which includes a mammalian form, 9 bird species and a reptile followed by 10 species associating with *C. decidua*. In contrast exotic species *P. juliflora* is not liked by animals (Table 1).

Table 1

Animal species observed in relation to 4 predominant plant species in different village institutions of village Rasala (Jaisalmer)

Predominant Plant Species	Mammals	Birds	Reptiles	Total Species
1. <i>Prosopis cineraria</i>	2	12	1	15
2. <i>Capparis decidua</i>	2	5	3	10
3. <i>Zizyphus nummularia</i>	1	9	1	11
4. <i>Prosopis juliflora</i>	0	0	0	0

Examination of nests and burrows in Rasala village (Table 2) suggest that *C. decidua* is liked most by animals. Ten nests and 88 burrows of different species were counted under this plant. This was followed by 17 nests and 19 burrows associated with *P. cineraria* and 6 nests and 10 burrows with *Z. nummularia*. No nest or burrow was found under *P. juliflora*.

Table 2

Nests and burrows of different animals found in relation to 4 predominant plant species in Rasala (Jaisalmer)

Predominant Plants	Nests (in trees)	Burrows on ground	Total Species
1. <i>P. cineraria</i>	17	19	36
2. <i>Capparis decidua</i>	10	88	98
3. <i>Z. nummularia</i>	6	10	16
4. <i>P. juliflora</i>	0	0	0

In Kanasar village the variety of animal species appears to be close to Rasala village (Table 3). Fourteen species, 3 of mammals, 10 of birds and a reptile was found associated with *P. cineraria* followed by 12 species associating with *C. decidua* and 10 with *Z. nummularia* and 1 with *P. juliflora*. Here, nests and burrows were found almost on the same pattern as found in Rasala. On *P. cineraria*, 13 nests and 13 burrows were counted followed by 8 nests and 86 burrows in *C. decidua* and 9 nests and 10 burrows under *Z. nummularia*. No nest and burrow was seen in association with *P. juliflora* (Table 4).

Table 3

Animals observed in relation to 4 predominant plant species in different village institutions of village Kanasar (Barmer)

Predominant Plant Species	Mammals	Birds	Reptiles	Total Species
1. <i>Prosopis cineraria</i>	3	10	1	14
2. <i>Capparis decidua</i>	2	6	4	12
3. <i>Z. nummularia</i>	1	8	1	10
4. <i>P. juliflora</i>	0	1	0	1

Table 4

Nests and burrows of different animals found in relation to 4 predominant plant species in Kanasar village (Barmer)

Predominant Plant Species	Nests (In trees)	Burrows on ground	Total species
1. <i>P. cineraria</i>	13	13	26
2. <i>Capparis decidua</i>	8	86	94
3. <i>Z. nummularia</i>	9	10	19
4. <i>P. juliflora</i>	—	—	0

Discussion

This study clearly demonstrated that the survival of animals depends on specific niches, plants and animals, small to large. Any alteration in these shall lead to survival problems for all those who occupy that niche. Some plant species are essential for the survival of animal

taxa. As such native plant species be given due cognisance like, *P. cineraria*, *C. decidua*, *Z. nummularia*, *S. procera*, etc. which support native animals and not the exotic species like *P. juliflora* which is creating havoc at the cost of native species, destroying the required habitat profile for animals. *P. juliflora* is counterproductive to overall biodiversity management in Thar compared to endemic forms (Ganguli et al. 1964, Kaul, 1963, Kumar and Bhandari, 1992; Noy-Meir, 1993).

The studies of burrows and nests strengthen the above argument further since no nests and burrows were supported by *P. juliflora* compared to native species. It seems that the survival of animals depends on the assemblage of specific herbs, shrubs and medium sized trees which together constitute the support device for animal taxa in nature since these plants species in association with animals bring about the fertility of soil. The burrows made by animals on the ground and nests in the trees work as indicators of survival mechanism of animals vis a vis the biodiversity.

The present findings receive good support from the observations of Advani and Jain (1982) on burrows, Agarwal et. al. (1976) on the proficiency of native plant species and *P. cineraria*'s support to grasses under it (Ahuja, 1980). A somewhat similar argument has been put forward by Akhtar and Lalonde (1994). Keeping in view the above facts, the GOI decided to declare some 135 villages of Barmer and Jaisalmer district covering an area of about 3100 sq. km, as the Desert Biosphere (Anon, 1988). This matches with the Global Biodiversity strategy of UNESCO (Anon. 1992, 1994).

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KNOW YOUR WILDLIFE

GORAL (*Nemorhaedus goral* Hardwicke 1823) is a wild goat found in Himalayan region, from Kashmir to Assam at altitudes from 2800 to 8000 feet. It prefers living on rugged hill sides and steep slopes on which it can run with remarkable ease. It is diurnal and passes nights in rocky caves, where panther cannot easily locate it.

It is light grey in colour, but changes according to season and elevation. The goral found in Shivalik ranges and outer Himalayas upto 5000 feet has light grey to brownish shades. But the ones found in chir pine forests bordering oak are dark grey in colour with a black line along the back bone.

Goral generally lives in pairs, but sometimes in herds of 5 to 10 and on good locations herds of 40-50 have also been seen. The old bucks are generally solitary and can be distinguished by their darker colouring. Both sexes have horns. Males have larger horns than females and measure 6"-8". The record horns are 9½". Horns are slightly curved towards the back.

Goral is an alert animal. It is tough and hardy and has a sturdy body with coarse hairs. A well built male goral measures 24"-28" at shoulders and 4' in length. It weighs roughly 24 kg. Its legs are very straight which keep it running very fast and over long distances, especially when being chased by panther or a Shikari.

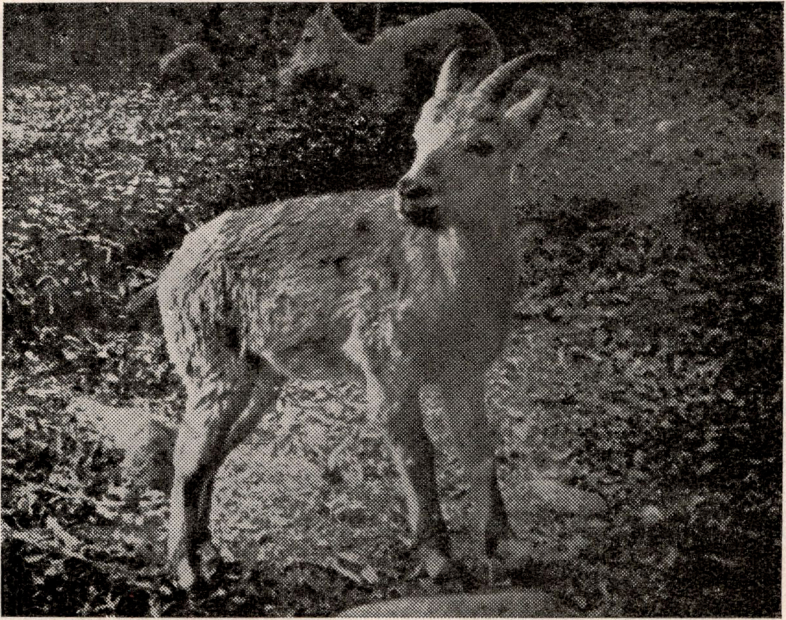
It grazes early in the morning and late afternoon. In the day time it rests. On a cloudy day it grazes throughout the day.

Rutting season is October to December and young ones are born in April-June. It gives birth to one fawn at a time. The main enemy is panther and of course man.

Its population has depleted fast over the years. It is included in Schedule III of the Indian Wildlife (Protection) Act.

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The Goral—Photo by Shiv Prasad



Barking Deer.

KAKAR (*Muntiacus muntjak*, Zimmermann-1780), generally called as barking deer, because its call sounds like the bark of a dog. Three species are recognised by naturalists, the Northern India *Muntiacus muntjak vaginalis* (Boddaert), the Southern India *Muntiacus muntjak aureus* (H. Smith) and in Malabar and Sri Lanka, *Muntiacus muntjak* [*malabaricus* (Lydekker)].

DISTRIBUTION : This small deer is found over a wide area of the Indo-Malayan countries and also in China, Formosa and Java. Here in India, it is found both in North India as well as in South India and in Sri Lanka. It is very common in Himalayas and in plains forests. In Himalayas it is found upto 2500 m. In sub-Himalayan region it is associated with Goral.

HABIT & HABITAT : It is diurnal in habit and frequents more or less thick jungle, often coming out to graze on the outskirts or in glades. When moving quietly in cover, both sexes utter subdued clicking noise made with the tongue. When alarmed, this turns into a series of short cackling sounds and becomes louder culminating in the full-voiced bark from which its name is derived. From a distance the call sounds like the bark of a dog, indicating the presence of tiger or panther. This deer is as ubiquitous as the panther.

Barking deer are solitary or found in pairs. They feed on herbs, grass, sprouts, fruits, seeds, small animals and snakes. It runs very fast and sneaks through thick jungle with remarkable dexterity.

DISTINCTIVE CHARACTERS : Only the male has antlers. The antlers are long bony pedicles averaging 4" in length and covered with hair. In females the horns are replaced by tufts of bristly hairs. About 1" long tusk like upper canines are also present in males, which are used for self defence.

Length of male ranges from 65 to 70 cm. and height at shoulders about 60 cm. Female is smaller than males. Colour of the animal is dark brown.

Rutting season is during winter months and young ones are born in spring. Its main enemy is panther and also man.

PRESENT STATUS : Greatly depleted in number and is included in Schedule III of Indian Wildlife (Protection) Act.

The villagers and shikaries call up the barking deer by blowing on a thin glabrous leaf of tree or blade of grass put between the fingers. The sound if skillfully rendered resembles the cry of a small deer in distress and ^{the} adult on the scene.

I.S. Negi

THE CLAWS THAT KILL AND THE BEAK THAT TEARS

Eagles, vultures, hawks, kestrels, falcons, kites and owls are known as birds of prey. They are dangerous to small or medium-sized animals.

These meat eaters have long claws for stabbing and gripping their prey. They also have sharp and powerful hook-tipped beaks for tearing their prey apart.

Birds of prey can see about four times more than man. Some hawks can even spot a grasshopper 330 feet away !

Eagles build their nests at the top of dead trees so that they can spot prey. The nest is a heap of big sticks, and though messy, it is strong enough to be used year after year with a few minor repairs.

Owls hunt in the dark as they can see clearly in the night. For hunting, they mostly rely on their hearing sense. Even a slightest rustle results in their emitting an ultrasonic sound wave which hits the prey in its vicinity and bounces back.

The bouncing waves help the owl know the location and size of the prey, and then it proceeds to attack it. This is known as echolocation.

Egyptian vultures love to eat the eggs of other large birds like ostriches. They use rocks as tools, throwing them at the eggs to smash the shells.

Osprey or the migratory fishing-hawk, hunts for fishes while hovering over the water. On seeing a fish, it hits the water with wings folded back and its feet forward.

It makes a big splash and vanishes inside the water. If it has aimed well it will rise in the air with a fish held firmly in its claws.

Vultures are carrion feeders which render great service to man as scavengers by speedily disposing off dead animals. Up to 100 vultures at a time may feed on the dead animal; sometimes these birds eat so much that they can barely fly.

Falcons mostly hunt other birds. They capture their prey by stooping on it with closed wings in the manner of a dive-bomber plane at a speed close to 200 km per hour. The prey falls to the ground when it is hit and the falcon follows to snatch up its prize.

Courtesy : Indian Express

NEWS AND VIEWS

NEWS

EXPRESS SPECIAL WILDLIFE

Latest DNA tests show Siberian genes in Indian tiger; mismatch may lead to sterility, mixed gene pool has no conservation value

Bad news for conservationists : Indian tiger isn't 100 pc swadeshi

Pallava Bagla

New Delhi, November 18

There couldn't have been a worse birthday present. When experts gather tomorrow to celebrate Project Tiger's silver jubilee, they will have a new reason to worry. Now there's conclusive scientific confirmation that the genes of the wild Indian tiger have been irreversibly polluted with those unique to Siberian tigers.

For conservationists, this is disturbing news. India spends about \$ 75 million a year to protect the tiger and ensure its genetic purity. The survival of any species in the wild depends on it being able to freely breed and reproduce. Whether these hybrids with this new set of alien genes are able to breed in India is anybody's guess.

Also, it's well known that a major mismatch of genes can result in sterility. More importantly, these hybrids are likely to be carrying genes that confer on them adaptability to the Siberian winter, a world away from the tropical climate of the terai jungle.

A DNA fingerprinting study has shown that hair samples taken from two wild tigers from the Dudhwa Tiger Reserve in northern India have Siberian genes. Lalji Singh, an expert on DNA fingerprinting at Hyderabad's Centre for Cellular and Molecular Biology, confirms this in the latest issue of the Indian journal *Current Science*. He suggests immediate DNA-profiling of all tigers to identify and segregate the hybrids.

But where did the Siberian genes come from in this Indian population that is totally cut off from its Siberian cousins? The story starts in the late 1970s. Amongst much controversy, Billy Arjan Singh, a conservationist living on the edge of Dudhwa, had reintroduced into the wild—in a "Living Free" type experiment—a zoo-bred captive tigress called Tara. She was a gift from Tycross Zoo in the UK and of Siberian parentage.

Wildlife experts like Ram Lakhan Singh who was then the Field Director of the Dudhwa Tiger Reserve strongly opposed this reintroduction saying that because the tigress was of mixed parentage, it would be unwise to reintroduce her into the wild. Later, it was R.L. Singh

who had actually shot Tara after it allegedly turned a maneater. But by then, she had bred and left her progeny in Dudhwa.

Today, there are only about 3,500 tigers in the wild in India down from 40,000 at the turn of the century. Incidentally, most of the captive tigers are largely hybrids between Bengal and Siberian sub species of tigers and hence not good for long-term conservation.

The present study has also been able to segregate the pure and hybrid individuals which was not possible till now.

Lalji says : "The source of the Siberian genes is probably from this single reintroduction and the hybrids we see today may be the progeny of Tara." Says Project Tiger director Prashanta Kumar Sen : "The findings are yet to be authenticated beyond this single report from Hyderabad and that they are planning to start a major research effort to get to the bottom of this mystery."

Officials blame rules for funds crunch though Cheetal Deer Park earns Rs. 7.5 lakh a year
Tame park deer might die as feeds taper off

M.V.R. Rao

November, 21

The survival of 23 cheetal, a sambhar, over 15 rabbits and 20 guinea pigs at the famous deer park here is threatened after the Forest Department has backed off from looking after them, pleading paucity of funds.

Animal lovers are angered by the move of department officials who have washed their hands of the issue on the plea of a Government resources crunch. It was the department which put the animals in the park in the first place. The Government has revoked the budget for the park scheme.

Divisional forest officer Abhay Kumar Singh told *The Indian Express*, "But we are somehow managing to pull through one way or another." He denied that the animals are starving. But, the deer look on helplessly as the feeds have tapered off. Their condition has deteriorated.

The Department fears that it will be difficult to feed them in the future." So far, we pulled through with funds from other heads but now to buy the feed the market debt will rise," Singh said.

The future for the orphaned animals appears bleak. If they are freed in the jungles, they will surely get killed, since they have become human friendly and their survival instincts have been numbed. The Khatauli Cheetal Deer Park was one of the pioneering efforts in

setting up such parks in Uttar Pradesh. It was established in 1974. A popular resort located by the Ganga Canal, it had become a favourite tourist spot for motorists travelling by the Delhi-Hardwar-Mussoorie highway.

However, there were attempts by a restaurateur also to sabotage the park, said sources. Had the Haryana Government owned the park, it would have converted it into a wildlife and tourism promotion scheme along with earning money for the Government, say tourism experts.

The Cheetal Deer Park has a restaurant attached to it which has been leased on a contract of Rs. 1,975 per day apart from the book stall auctioned off for around Rs. 22,000 per annum. The total annual income was around Rs. 7.5 lakh, says Singh. But the problem, he says, is that "we are not permitted to divert money from this revenue."

Animal lovers are aghast at the State Government's apathy. Singh says they will not allow animals to starve. "We are negotiating with the Lucknow and the district administration," he said.

दैनिक भास्कर—दिनांक 17-10-98

करेरा अभयारण्य से काले हिरणों का सफाया

राजस्थान के जोधपुर जिले में फिल्मी हस्तियों द्वारा दो काले हिरणों के शिकार पर मच रहा बवाल न केवल मध्य प्रदेश के वन्य-प्राणी संरक्षण के लिए जिम्मेदार अमले, बल्कि आम जनता के लिए भी शर्मनाक है। ऐसा इसलिए, क्योंकि यहाँ शिवपुरी जिले के करेरा अभयारण्य में कुलांचे भरते तीन हजार से अधिक काले हिरणों की केवल पांच सालों में निर्मम हत्या कर दी गई, लेकिन किसी ने शोर नहीं मचाया। साढ़े तीन हजार काले हिरणों की संख्या वाले करेरा में अब केवल दो-ढाई सौ हिरण ही बचे हैं। वन्य-प्राणियों की रक्षा के प्रति चिंतित और करेरा में हुए हिरण संहार से व्यथित वन्य जीव प्रेमियों की सहज टिप्पणी है कि यहाँ भी शिकारी यदि 'फिल्मी स्टार' होते तो शुरुआत में ही हो-हल्ला मचता और हजारों हिरण बच जाते।

वन्य-प्राणियों के संरक्षण में सतर्कता बरतने वालों के दावों को शिवपुरी का करेरा अभयारण्य खोखला सिद्ध कर रहा है। करेरा अभयारण्य की स्थापना सोन चिड़िया के लिए वर्ष 1981-82 में की गई थी। शुरुआत में यहाँ केवल आठ सोन चिड़ियां थी, किन्तु धीरे-धीरे इनकी संख्या बढ़ती गई। संरक्षण के प्रयासों का परिणाम यह हुआ कि छह साल की अवधि में सोन चिड़ियों की संख्या चार गुनी हो गई। इसी अभयारण्य में सोन चिड़ियां तो बढ़ी ही, बड़ी संख्या में काले हिरणों का आना भी शुरू हो गया।

वन विभाग के सूत्रों के अनुसार वर्ष 1981 में यहाँ कुल पचास काले हिरण थे जो कि एक दशक में, 1991 तक बढ़कर साढ़े तीन हजार हो गये। तब यह समझा जाता था कि मध्य प्रदेश में यदि काले हिरणों को बड़ी संख्या में स्वच्छंद कुलांचे भरते देखा जा सकता है तो वह करेरा अभयारण्य ही है। इसी बीच स्थानीय किसानों के हित आड़े आने लगे। अपने हितों के लिए किसानों ने शहरी शिकारियों के माध्यम से जो कुछ किया वह वन्य

जीव प्रेमियों के लिए दिल दहला देने वाला है। हुआ यह कि सोन चिड़िया और काले हिरण के विचरण से किसानों के लिए उनकी पड़त की भूमि पर खेती करना मुश्किल होने लगा। अभयारण्य की तात्कालिक जानकारी रखने वाले वन विशेषज्ञ बताते हैं कि किसानों ने पहले सोन चिड़िया को अपना निशाना बनाया। सोन चिड़िया का इतना अंधाधुंध शिकार किया गया कि केवल तीन-चार सालों में जब सोन चिड़िया की अभयारण्य में स्थिति का आंकलन किया गया तो पता चला कि यह चिड़िया प्रजाति करेरा से लगभग समाप्त हो चुकी है। काले हिरणों से किसानों की समस्या यह थी कि वे उनके खेत चर जाते थे। बावजूद इसके कतिपय कारणों से ग्रामीण इन्हें मारते नहीं थे, लेकिन उच्चतम न्यायालय द्वारा एक जनहित याचिका पर दिये गये फैसले पर जिस तरह से राजस्व एवं वन विभाग ने अमल शुरू किया उससे काले हिरणों की शामत आ गई। न्यायालय ने अपने फैसले में कहा था कि सरकार सभी अभयारण्यों और राष्ट्रीय उद्यानों का शीघ्र व्यवस्थापन करे। इस आदेश के परिप्रेक्ष्य में राजस्व एवं वन विभाग ने करेरा अभयारण्य तथा आसपास के कृषकों की जमीन की सूची बनाने का काम शुरू किया। इससे किसानों में यह डर घर गया कि अब अभयारण्य की बजह से उनकी जमीन छिन जायेगी। वन विभाग के सूत्रों का दावा है कि किसानों में उपजा यह डर निराधार था, किन्तु उन्हें यह प्रभावी ढंग से समझाया न जा सका। नतीजा यह हुआ कि अभयारण्य से पिण्ड छुड़ाने के लिए किसानों ने काले हिरणों के सफाये की ठान ली। बताया जाता है कि इसके लिए झांसी और ग्वालियर के शिकारियों को बुलाया गया। वन्य-प्राणी संरक्षण अधिनियम की बंदिशों तथा वन एवं पुलिस विभाग की 'चौकसी' को धता बताते हुए शिकारियों ने बेदर्दी से हिरणों की हत्या की। नतीजतन अभयारण्य में 1993-94 में जो काले हिरण लगभग साढ़े तीन हजार थे, अब मुश्किल से ढाई सौ बचे हैं।

आश्चर्यजनक तथ्य यह है कि इतनी बड़ी संख्या में हुए अवैध शिकार पर राज्य में कभी शोर नहीं मचा। आम जनता की जानकारी में कभी यह नहीं आया कि हिरण मारने वाले शिकारियों में से कितने पकड़े गये और उनके विरुद्ध क्या कार्रवाई (यदि हुई तो) हुई। जोधपुर में फिल्म सितारों सलमान खान, सेफ अली खान तथा उनके साथियों द्वारा किया गया शिकार जिस तरह देश भर में चर्चा में है, उससे प्रदेश के वन्य जीव प्रेमियों का दुःखी होना स्वाभाविक है। वे सोच रहे हैं कि ऐसी संवेदनशीलता यहां होती तो वन्य-प्राणियों की संख्या तेजी से न घटती, या फिर शिकार पर बवाल के लिए यदि शिकारियों का फिल्म स्टार होना जरूरी है तो यहां भी कुछ सितारों को चुपचुप बुला लिया जाता।

FELICITATIONS

Dr. Lal Singh Rajpurohit, a dedicated wildlifer and life member of the Wildlife Preservation Society of India, has been elected as Fellow of the National Academy of Sciences, India (Estd. 1930) in the year 1997, for his contributions in the field of Animal Behaviour and Ecology (Environmental Science).

Our heartiest congratulations to Dr. Rajpurohit for the rare distinction.

Following is a brief note about Dr. Rajpurohit's scientific contributions :

Editor

Dr. Lal Singh Rajpurohit, Ph.D., F.CEC, FNA Sc., (born in 1950) Department of Zoology, JNV University, Jodhpur had worked as Junior Research Fellow and Senior Research Fellow for about 5 years in Man and Biosphere (MAB) Programme of UNESCO run by the Department of Environment and Forests, GOI, entitled "Ecobehavioural Studies of Hanuman langurs, *Presbytis entellus*" from July, 1983 to Dec., 1987. Shri Rajpurohit earned his doctorate from the University of Jodhpur in 1987. Dr. Rajpurohit visited Germany for six months (i.e. June—Dec., 1988) as a DAAD Fellow for Postdoc work. He has got 9 years of teaching and research experience, and is working as permanent Assistant Professor of Zoology since Dec. 30, 1991.

Dr. Rajpurohit has published large number of research papers, articles, and reports. His papers appeared in international and national Journals, books and periodicals. In July, 1990, Dr. Rajpurohit was sponsored by the Japan Govt. to participate in the XIII International Primatological Society (IPS) Congress held at Kyoto University, Japan.

Dr. Rajpurohit was awarded the prestigious Young Scientists Award, called Marie Curie Bursary—Award of the Commission of the European Communities (EC), Brussels, under the auspices of the Ministry of Science and Technology, Govt. of India. He worked in Germany for one year i.e. June, 1993—May, 1994 as CEC fellow at George—August University, Gottingen. During this period he visited several other EC—Member countries and delivered lectures in various institutes and universities as guest scientist (Spain, France, Netherlands, Belgium, England).

In August, 1996, Dr. Rajpurohit was invited to participate and deliver a guest lecture in an International Symp. on "Evolution of Asian Primates—96" held at Primate Research Institute, Kyoto University, Japan, sponsored by the Ministry of Science, Culture, Education and Sports, Govt. of Japan. On the strength of excellent work carried out by Dr. Rajpurohit the National Academy of Sciences, India elected Dr. Rajpurohit its Fellow in 1997.

Dr. Rajpurohit is the Secretary of the 'Desert Wildlife Conservation Society', Jodhpur. He is associated with several academic, wildlife conservation, environmental and public awareness organisations like Indian Science Cong. Asso. (ISCA) Calcutta, International Primatology Society (IPS)—USA, INTACH—New Delhi, Association for Study of Animal Behaviour (ASAB)—Cambridge, European Sociobiology Society (ESS), Amsterdam, Bombay Natural History Society (BNHS), Bombay, Primatological Society of India (PSI), New Delhi, Ethological Society of India (ESI), Bangalore, Wildlife Preservation Society of India (WPSI)—Dehra Dun and the WWF Nature International—Gland.

DONATIONS

We have been making appeal to our members/subscribers, in the last two successive issues of 'Cheetal', for making donations to the Society. Elsewhere, we have also mentioned that no voluntary organisation, let alone a wildlife society, can run on membership fee and subscriptions alone and liberal donations are required for its smooth functioning.

We are happy to inform that the following life members have favourably responded to our appeal. The Society is grateful to them for their spirited response and hope that other members will emulate them.

Mr. E. Hanumantha Rao
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Ms. Sumitra Rath
C/O Kanishka Rath
Friends' Colony,
Cuttack—753 001 :

Rs. 500/-

Ms. Sumitra, a wildlife activist and environment enthusiast, has, this year (1998), been selected in the Indian Defence Estates Service. Our warm congratulations and best wishes to her.

Wildlife Preservation Society of India

1. The aims and objects of the Society are as follows :-

- (a) To promote interest and impart knowledge regarding the preservation and conservation of all forms of wildlife, particularly among the youth of the country.
- (b) To cooperate with the Govt. of India and State Governments and with others Societies and Institutions having similar aims and objects in working for the interests of wildlife.
- (c) To assist in enforcing and actively supporting the Forests Acts, Wild Birds and animals Protections Acts and Rules etc. of State Governments and the Indian Arms Act and Rules in so far as they pertain to wildlife and to bring to the notice of the authorities any infringement of the same and to assist in the detention and prosecution of offenders in respect of such laws.
- (d) To advise and help the Govt. and wildlife administrators in the formation, maintenance and protection of Sanctuaries and National Parks, preservation of wildlife in general and endangered species of india in particular and in the introduction of exotic species into the country, rehabilitation of endangered species etc. and in the formulation and amendments of rules and acts, so as to conserve and increase wildlife stocks.
- (e) To raise funds for carrying out the above aims and objects and to found and maintain museums, reading rooms and libraries of natural history in order to disseminate knowledge regarding wildlife.
- (f) To carry out publicity and propaganda for the preservation of wildlife in India by means of monographs, journals, films, filmstrips and other feasible methods.
- (g) To assist members of the Society in obtaining facilities for viewing and photographing wildlife in India.
- (h) To conduct research into the problem of Wildlife management in India, and in pursuance of this, to initiate, encourage and, where possible assist in the projects for the study of threatened species and related objects and to provide reference and reserch facilities for such work.
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